METAL PRODUCTS MANUFACTURING

MPM

OCTOBER 1960

Serving the Appliance and Fabricated Metal Products Industry

Cast Iron Cookware Production Goes Modern — Page 45

Precision Production at Seeburg Corp. — Page 28

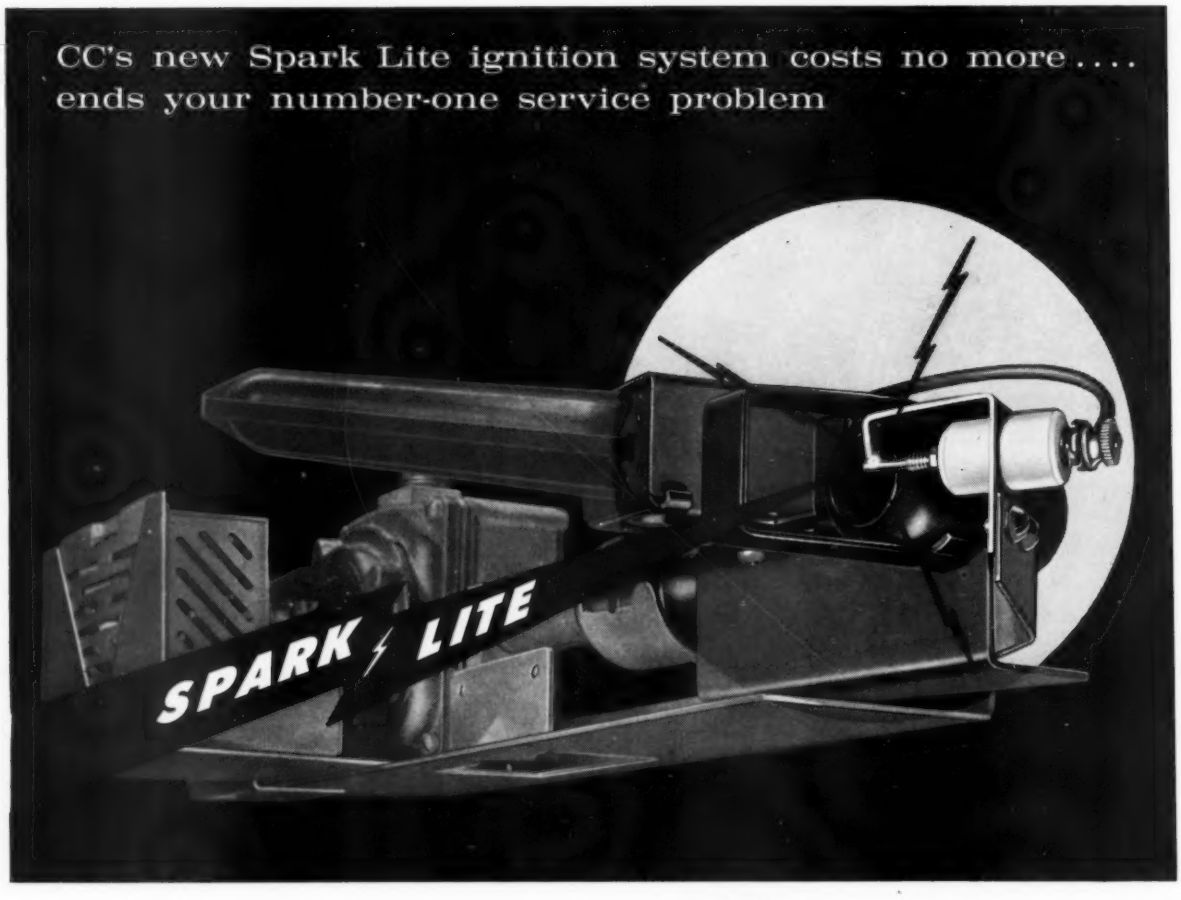
New Finished Product Conveyor System at Westinghouse — Page 97

ELIMINATE PILOT, ELIMINATE GLOW-COIL, GET INSTANTANEOUS GAS IGNITION EVERY TIME

On gas dryers . . . as your own records will show . . . one of the most frequent causes for service complaints is failure of the pilot burner and glow-coil igniter. This problem now becomes a thing of the past. Controls Company of America's new Spark Lite ignition system works effectively in spite of low gas pressure, drafts, and low line voltage. Its simple operation gives it extremely long service life . . . keeps the housewife happy with your gas dryer year after year.

CC's complete Spark Lite system consists of a combination main burner control valve and regulator, a flame detector, a safety lock-out control, spark electrode, and transformer. The system is furnished as a complete unit, ready for installation . . . ready to add saleability and customer satisfaction to your dryers.

Write today for all the facts. Learn all the values of CC's "Control Systems Approach" to solving this costly problem.



Creative controls for industry

CONTROLS COMPANY OF AMERICA

APPLIANCE AND AUTOMOTIVE DIVISION

9559 Soreng Avenue • SCHILLER PARK, ILLINOIS

Armco ZINCGRIP Steel Helps Norge Put Rust-Resisting Warranty On Washer Cabinets

Fabricating practices require little change in switch to zinc-coated steel

All 1960 automatic washers made by Norge Division, Borg-Warner Corporation are "warranted rust-proof" by the manufacturer. One reason is that cabinets are now fabricated from rust-resisting zinc-coated steel.

FABRICATION NO PROBLEM

Cabinets made from Armco ZINCGRIP® have the same design as those previously made from cold-rolled steel. Fabricating practices require only slight modification, create no problems. The special hot-dip coating of zinc on Armco ZINCGRIP Steel stretches with the base metal—holds tight during working. Following fabrication, cabinets are phosphatized. Then an epon prime coat is applied, followed by an alkali-resistant white finish coat.

Perhaps zinc-protected, workable Armco ZINCGRIP holds the key to extra sales advantages for your products, too. Just mail the coupon for more information.

This symbol of quality can help you sell

ARMCO STEEL CORPORATION
2500 Curtis Street, Middletown, Ohio
Please send your catalog on Armco ZINCGRIP Steel

Name_____ Title_____
Firm_____
Street_____
City_____ Zone____ State____

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

LOADS OF IMPROVEMENT

Every day . . . truckloads of Kerns Drawing Compounds are routed to satisfied customers. Check these outstanding built-in advantages.

1. Better drawing ability permits severe draws; film does not break down under heat and pressure.
2. Parts are easily cleaned.
3. Allows drawing of commercial and "off" quality steel.
4. Solves scratching and scoring problems.
5. Permits greater "hold-down" pressures without breakage, eliminates wrinkled surfaces.
6. Reduces enameling rejects generally attributed to drawing lubricants.
7. Increases press production.
8. With Kerns ***"DRY-FILM"*** ® metal can be drawn minutes or months after treatment; coating will not deteriorate with age.
9. Blanks or sheets can be stored after treatment.
10. Inhibits rusting of steel in storage.
11. You get less scrap . . . cuts costly rejects.
12. Safety and workman morale are greatly improved.

Remember . . . with Kerns you get compounds tailored to your operation.

Memo Billing Trial Basis—

Kerns will supply recommended material for production test . . . no formal invoice rendered unless completely approved in production.

World's Largest Exclusive Manufacturer of Specialized Industrial Lubricants

KERNS UNITED corporation

2659 EAST 95TH STREET, CHICAGO 17, ILLINOIS

Subsidiary Plant: KERNS PACIFIC CORPORATION 630 EAST BATAVIA STREET, ORANGE, CALIF.

Representatives in Principal Cities

MPM

(including finish)

MONTHLY TRADE PUBLICATION

Established January 1944

Published by

DANA CHASE PUBLICATIONS, INC.

York Street at Park Avenue, Elmhurst, Illinois
Telephones • TErrace 4-5280 • TErrace 4-5281

NBP BPA

OCTOBER • 1960

VOL. 17 • NO. 10

FEATURES

SHORT FEATURES

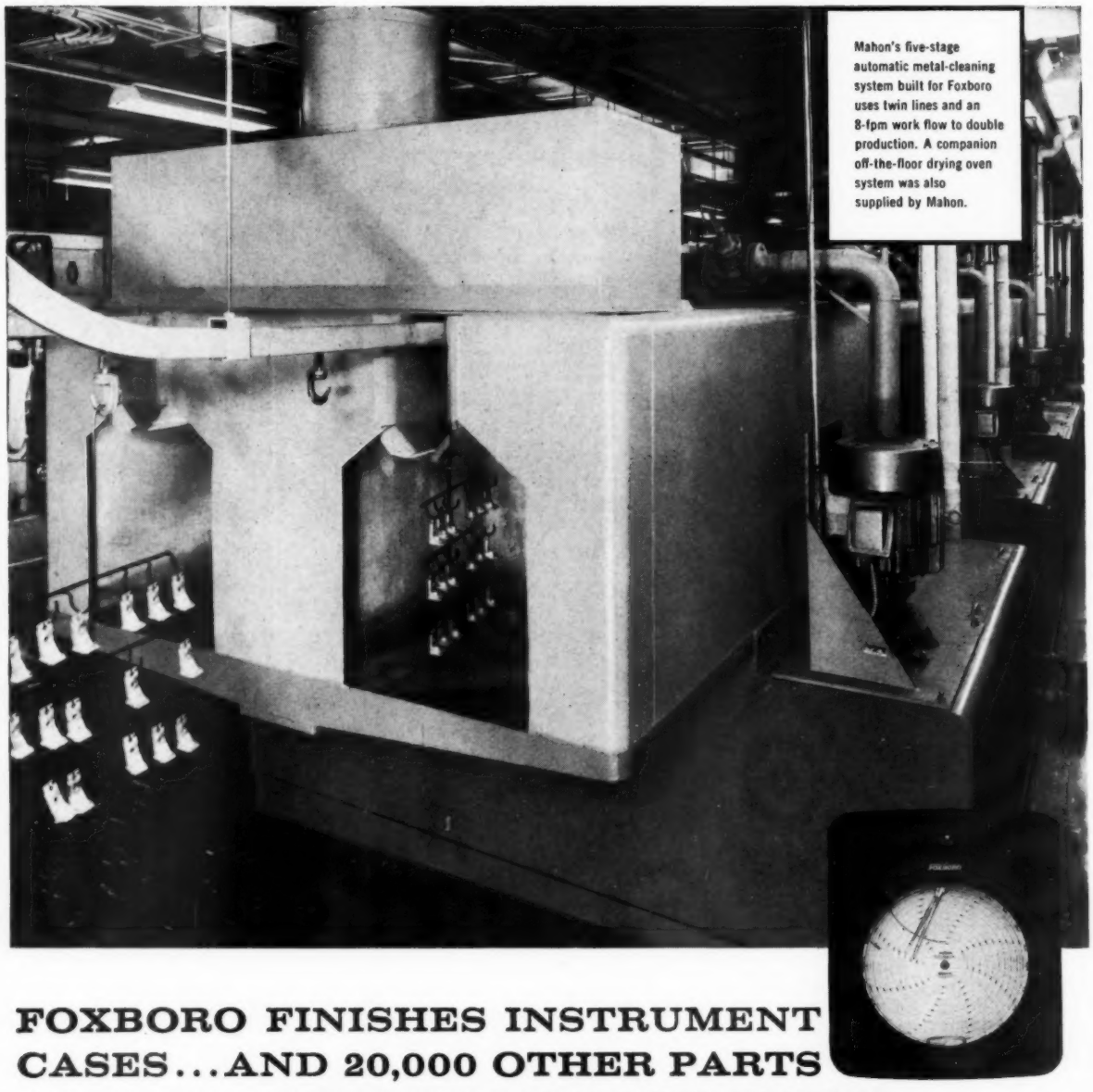
DEPARTMENTS

METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

Accepted as a controlled circulation publication at Aurora, Illinois.



Mahon's five-stage automatic metal-cleaning system built for Foxboro uses twin lines and an 8-fpm work flow to double production. A companion off-the-floor drying oven system was also supplied by Mahon.

FOXBORO FINISHES INSTRUMENT CASES...AND 20,000 OTHER PARTS AS WELL...WITH MAHON EQUIPMENT

The Foxboro Company of Foxboro, Mass. is meeting the stepped-up industrial need for control and measuring instruments. Two new Mahon Finishing Systems and other allied equipment were recently installed to help solve Foxboro's accelerated production problems for these high-quality, high-precision products. The result: an automatic metal-cleaning process, flexible enough to handle some 20,000 parts—efficient enough to double capacity; and a space-conserving off-the-floor drying-oven system that integrates all priming and finish painting. The Mahon-engineered and built equipment not only met new production requirements under improved working conditions but also offered color flexibility (six of more than 150 colors can be run at one time).

Improved finishing is probably the *easiest . . . and most economical . . . product improvement* you can make. Call in a Mahon engineer and get the facts on what Mahon can do for your product . . . your costs.

WRITE FOR MAHON CATALOG A-660
ALSO IN SWEET'S P. E. FILE

YOUR BIGGEST VALUE IS IN MAHON'S PLANNING & ENGINEERING EXPERIENCE

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN
MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, San Francisco and Torrance.

MAHON

Consider all four

when you select an aluminum source

QUALITY... Consistent . . . usable . . . exact for your needs time after time, order after order. Reason: Fairmont's long aluminum experience plus modern precision equipment, a 34-year tradition of rigid quality control.

ENGINEERING . . . The services of field representatives who are *engineers* . . . men with mature experience in aluminum. They understand your fabrication problems . . . *prescribe* the sheet that's best for your application.

AVAILABILITY... Every Fairmont mill product is rolled every day. You can depend on Fairmont for the exact product you need . . . custom-rolled and on its way to you fast . . . sometimes in a matter of hours.

DELIVERY... With our entire operation under one roof, your order gets personal attention *all* the way. Our own truck fleet . . . operated by Fairmont men who specialize in aluminum handling . . . guarantees delivery unequalled for speed and dependability.

For the four best reasons, specify sheet, coils and circles from expanding . . .

FAIRMONT ALUMINUM COMPANY

subsidiary of CERRO DE PASCO CORPORATION

Sales Offices in Principal Cities. Mill: Fairmont, West Virginia

Chicago Vitreous teams with Sunbeam

to bring you

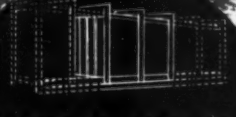
ENAMELING FURNACES

BACKED BY PROVEN ENGINEERING

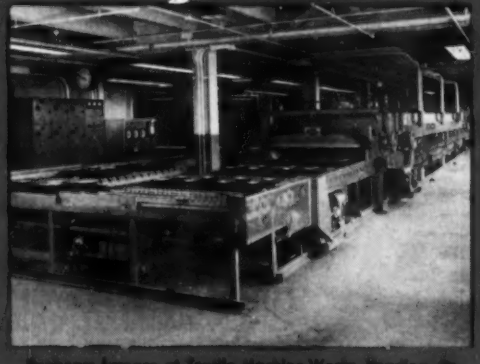
FURNACES THAT NEED NO FOUNDATION

FURNACES THAT CAN BE MOVED ANYWHERE, INTACT

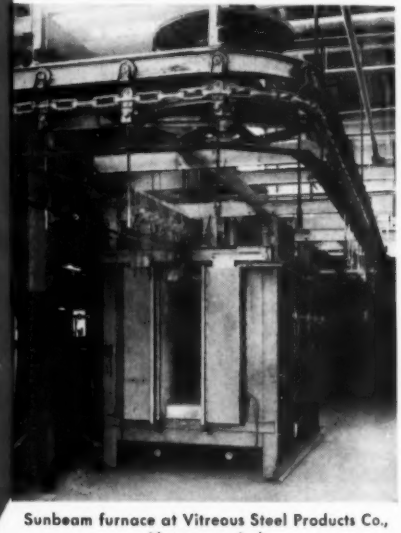
FURNACES THAT CAN BE EXPANDED TO MEET INCREASED PRODUCTION NEEDS



FURNACES THAT CAN BE CONVERTED FROM INTERMITTENT TO CONTINUOUS



Sunbeam furnace at Textile Machine Works, Reading, Pa.



Sunbeam furnace at Vitreous Steel Products Co., Nappanee, Ind.

FURNACES THAT GIVE YOU PRICE AND OPERATION ADVANTAGES

Your Chicago Vitreous sales or service representative will be happy to discuss these furnaces with you, or contact us direct.

FOR FINEST FRIT—
CHICAGO VIT

Chicago Vitreous **CORPORATION**
A Division of The Eagle-Picher Company
1425 S. 55th Court, Cicero 50, Illinois

Exclusive Representatives to the Porcelain Enamel Industry for Sunbeam Furnaces.

Chicago Vitreous offers

COMPLETE ART ENGINEERING SERVICE

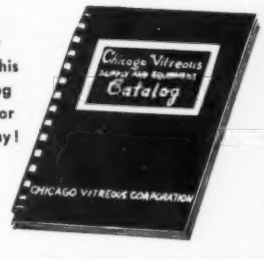
from layout to operation

Thinking about plant changes, modernization, expansion or even a completely new plant? When you are, you can turn to Chicago Vitreous for engineering assistance with confidence . . . with the knowledge that the layout, equipment recommendations, and costs will be realistic. You'll find it profitable to take advantage of the many years of experience that are yours when you call on Chicago Vitreous for assistance in any way.

FOR FINEST FRIT — CHICAGO VIT

No matter what you need... in PORCELAIN ENAMELING SUPPLIES and EQUIPMENT Chicago Vit can supply it!

If you do not have this Catalog send for it today!



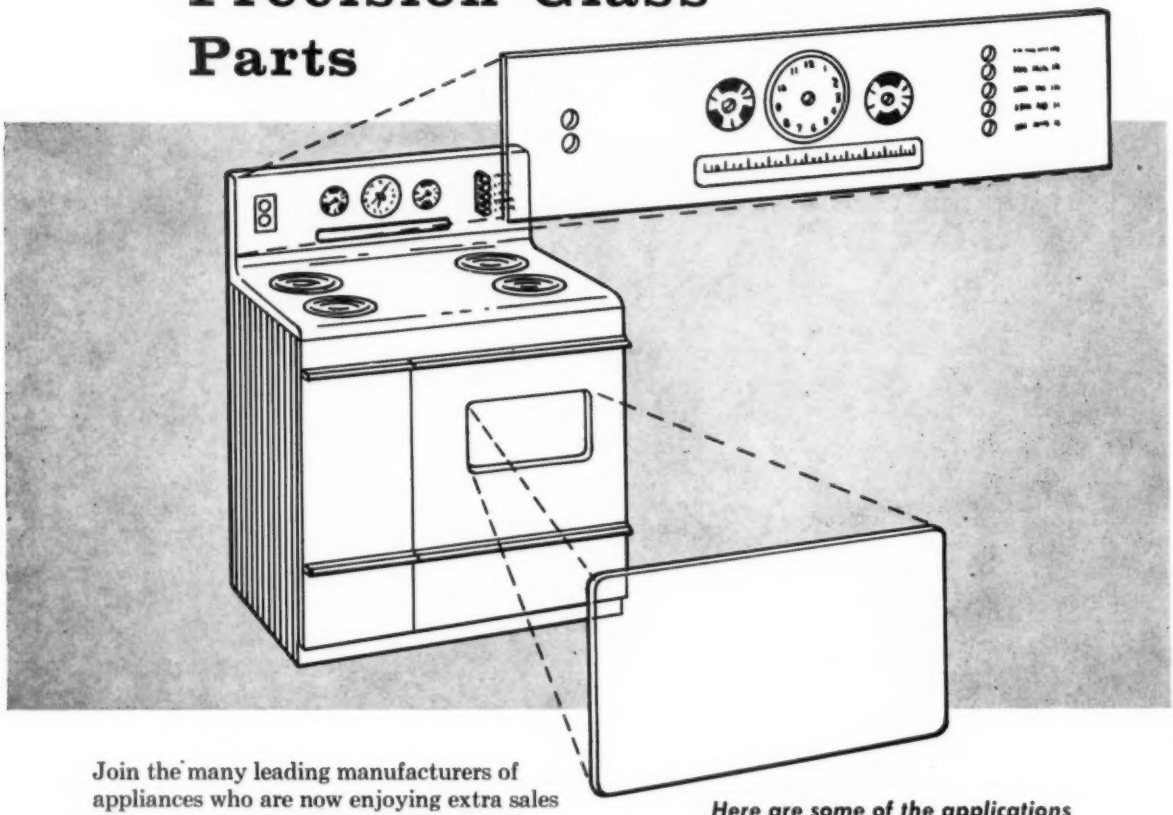
Chicago Vitreous **CORPORATION**

A Division of the Eagle-Picher Company

1425 South 55th Court • Cicero 50, Illinois

MARSCO

for the finest in Precision Glass Parts



Join the many leading manufacturers of appliances who are now enjoying extra sales from the appeal and prestige contributed thru the luster of glass. Glass will enhance the beauty and broaden the acceptance of your product. It can be hardened, heat-treated or tempered to survive consumer usage unscathed.

Let Marsco's craftsmen engineering team impart to your product all the advantages of glass.

Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:

- CLOCK AND TIMER CRYSTALS
- RADAR EQUIPMENT
- AIRCRAFT ACCESSORIES
- OVEN DOOR WINDOWS for both Conventional and Built-In Ranges
- LIGHT LENSES
- PHOTOGRAPHIC EQUIPMENT
- DIALS AND NAME PLATES
- TELEVISION EQUIPMENT
- INSTRUMENTS
- MEDICAL EQUIPMENT
- LAMP GLASS
- SHELVING
- ROTISSERIES
- WASHING MACHINES
- DRYERS
- PEEP SIGHTS FOR WATER HEATERS

Special Shapes for: Instruments, Gauges, Household and Industrial Appliances.

ask for the man from

Marsco

MARSCO MFG. CO., 2901 S. HALSTED ST., CHICAGO 8, ILL.

stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for HOMES AND HOME PRODUCTS

McLouth Steel Corporation,
Detroit 17, Michigan

Manufacturers of high quality Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

McLOUTH STAINLESS STEEL

Here's why we're up to our ears in screws! ...SOUTHERN SCREWS

A stock of 1,500,000,000 fasteners is a whale of a lot of screws, bolts and nuts. Why maintain such a huge stock? Why mention it in our ads?

The reason 1,500,000,000 fasteners are stocked in Southern Screw's Statesville plant is to let you know that regardless of the size, head style, materials or finish of the standard fasteners needed for profitable assembly in your plant, Southern carries them in stock. This means that your order, large or small, can be on its way to you within hours after it is received, if you request rush service.

And you can be sure that the Southern fasteners you order are quality fasteners made with the know-how that comes from nearly 15 years of specialization in fasteners exclusively.

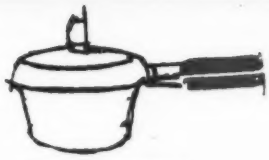
YOU are the reason we are up to our ears in fasteners! Southern makes them for you, stocks them for you. We are ready — today — to fill your order, whether for standards or for specials. Ask your local Southern distributor for our current Stock List or write direct to: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

Manufacturing and Main Stock in Statesville, North Carolina
Warehouses: New York • Chicago • Dallas • Los Angeles

- Machine Screws & Nuts
- Tapping Screws • Stove Bolts • Drive Screws
- Continuous Threaded Studs • Carriage Bolts
- Wood Screws

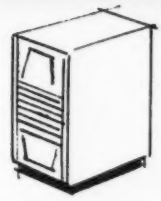
METAL FURNITURE



PRESSURE COOKERS

WAFFLE IRONS

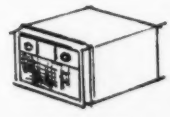
VACUUM CLEANERS



DEHUMIDIFIERS

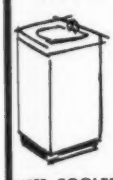
FLOOR POLISHERS

MACCO BLU-COAT



AIR CONDITIONERS

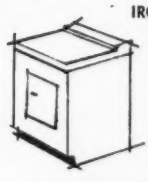
KITCHEN CABINETS



WATER COOLERS

IRONERS

BARBECUERS



CLOTHES DRYERS

the one

PRACTICAL, ECONOMICAL

water soluble

RUST PREVENTIVE

that lends itself to so many applications

STEEL • CAST IRON • FORGINGS • DIE CASTINGS

BLENDERS

ROASTERS

PREVENTS RUST between production operations and assembly...during transportation and storage. Facts and costs from your Macco man are yours for the asking!

FANS

CLOCKS

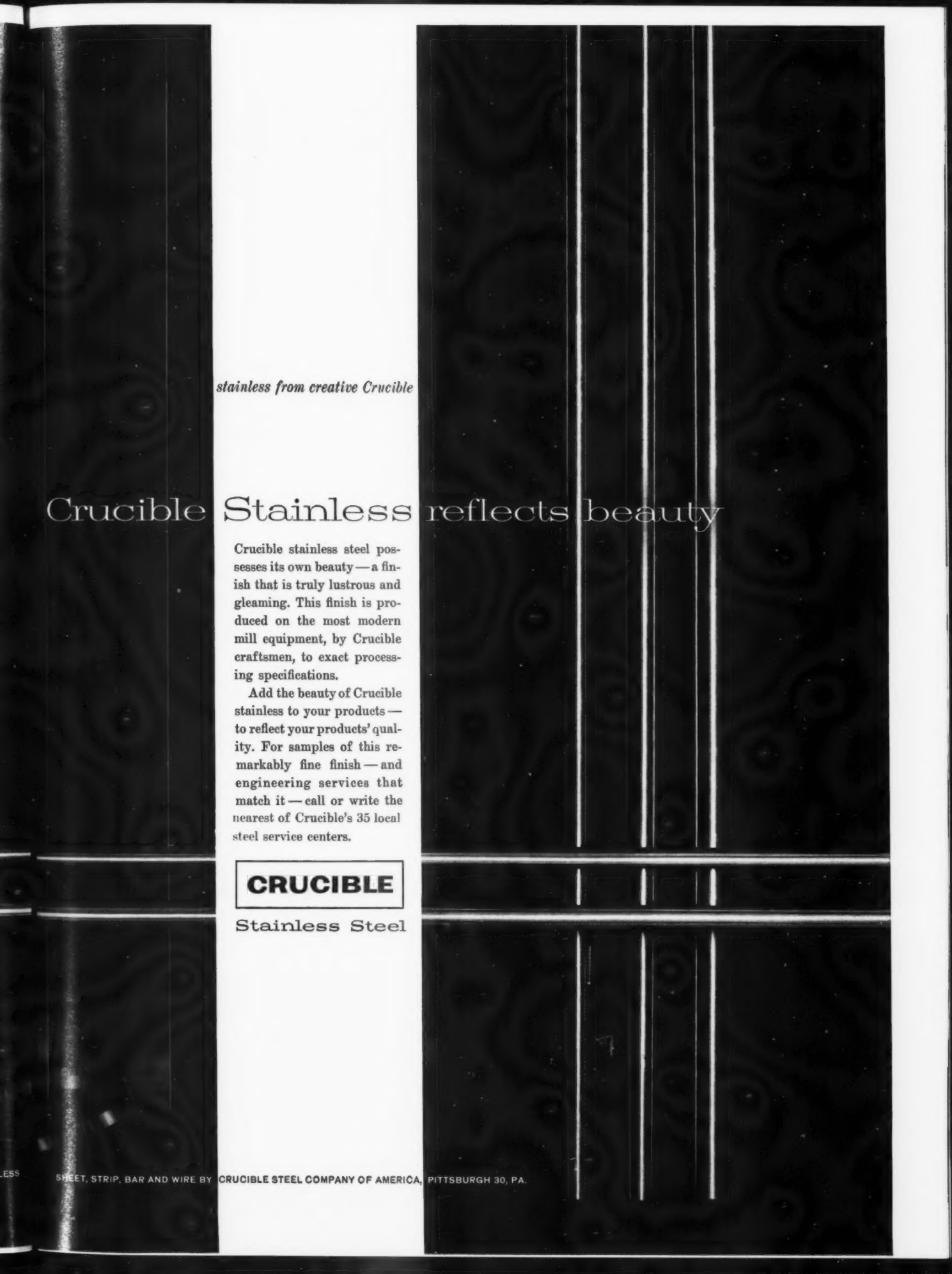
MACCO BLU-COAT is applied easily in spray washers or dip tanks . . . another of the many reasons why

THE METALWORKING INDUSTRY LOOKS TO MACCO FOR LEADERSHIP

MACCO
PRODUCTS COMPANY

9228 S. SANGAMON ST., CHICAGO 20, ILLINOIS
PRESCOTT 9-0800

GOWN BY FON TAYNE; STAINLESS



stainless from creative Crucible

Crucible Stainless reflects beauty

Crucible stainless steel possesses its own beauty — a finish that is truly lustrous and gleaming. This finish is produced on the most modern mill equipment, by Crucible craftsmen, to exact processing specifications.

Add the beauty of Crucible stainless to your products — to reflect your products' quality. For samples of this remarkably fine finish — and engineering services that match it — call or write the nearest of Crucible's 35 local steel service centers.

CRUCIBLE

Stainless Steel

SHEET, STRIP, BAR AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA, PITTSBURGH 30, PA.

No other Frit producer can know as much about *your* enameling problems as Ing-Rich

● In our own large enameling operation we, just like you, are interested in high quality enameling at the lowest possible cost.

The problem starts with our enameling plant technicians who have certain Frit requirements. The big advantage here is that our technicians can carry the problem direct to our ceramic engineers. Then, working hand in hand the ceramic engineers and our enameling plant technicians have to prove their case under PRACTICAL working conditions.

• • •

This plant tested "Know How" from the laboratory on thru to the finished product is at the disposal of Ing-Rich Frit customers. This "Know How" will make for better enameling results at lower costs in your plant as it has in our own enameling operations.

Pioneer Producer of
LIFETIME
Porcelain Enamel Products

INGRAM-RICHARDSON, INC.
OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA

MPM

editor's mail

No yearly model changes

Gentlemen: We want to thank you for the opportunity you gave us to send editorial material for your annual Home Laundry Section of the September issue of METAL PRODUCTS MANUFACTURING magazine.

Most major appliance manufacturers, we realize, introduce new model lines each year and many probably are ready for announcement about this time of year. This would make your September issue a very timely one for them. *Here at Ironrite, however, we do not have a yearly model change as such, but have a policy of incorporating improvements in our Ironrite ironers as they are ready for market regardless of the calendar.* This will explain why we have not sent material to you for your September issue.

In engineering as well as marketing, we will have important newsworthy information for you about Ironrite Inc. from time to time, and we will be pleased to send it to you as quickly as available. Perhaps next year we can have an entry for the "Mrs. Home Laundry Queen" contest for 1962.

We do want you to know we appreciate your having thought of us for your September issue.

L. E. Clancy, Advertising & Sales Promotion Manager
Ironrite Inc.
Mount Clemens, Mich.

Many inquiries received

Gentlemen: We have just received your letter of July 6th, for which we thank you.

By the letters of many American firms who contacted us, we realize that you have already published our letter in your magazine.

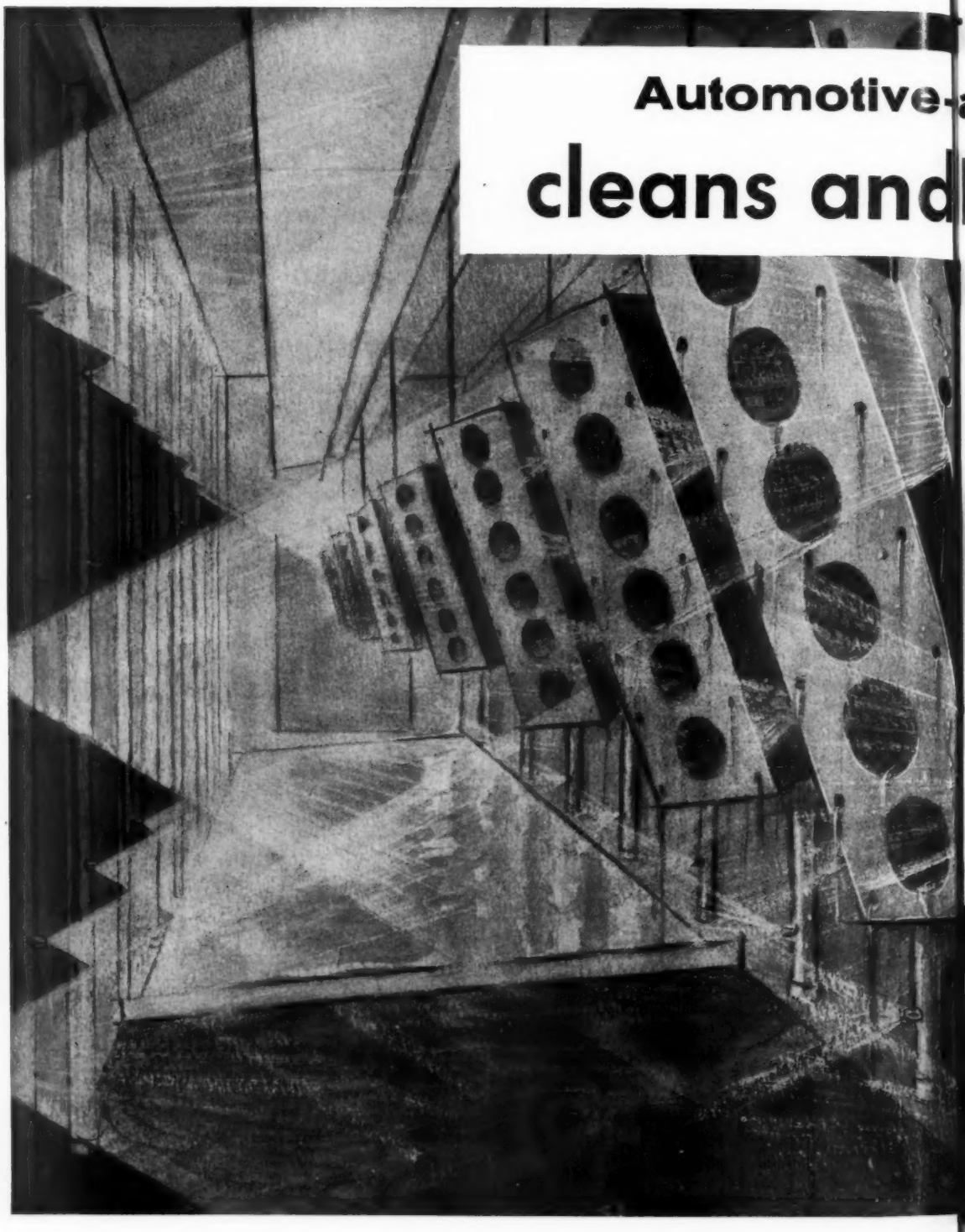
We thank you very much for your kindness and we should be glad to present our thanks to Mr. Bartlet, component of the Economic American Mission, who visited Sao Paulo a few months ago, and who had suggested us to contact you.

Without any further, we remain

Mancal S. A.
Ind. & Com. de Metais em Po
Sao Paulo, Brazil

A letter to MPM from Mancal S. A. requesting guidance in establishing contacts with American manufacturers appeared in the August, 1960 issue. The Brazilian firm manufactures self-lubricated bushings and bearings, and desires to get in touch with American firms interested in entering the Brazilian market. MPM's role as middleman appears to have been successful.

The Editors



To remove soils and prevent rusting

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 FIELD SERVICE MEN • OVER 160 MATERIALS

e-approved Oakite 198
d PREVENTS RUST, too

. . . thoroughly washes in-process parts

. . . provides temporary protection against rust

Two essential jobs in one—that's what spray washing with Oakite 198 is presently doing in the automotive industry. It thoroughly, speedily removes machining and shop soils from processed parts. Then it assures that the freshly machined surfaces will remain unmarred by rust right up to assembly time. It does this by leaving a streak-free residual protective film that does not interfere with visual inspection, and which need not be removed.

Oakite 198 satisfies the industry's exacting production standards for high cleaning efficiency with safety. It clears away even heavy soils when operated at temperatures up to 180°F. Light soils can be eliminated with room temperature operation if desired. Even metal chips disappear under its efficient detergent activity.

Along with smut-free cleaning and rust-protection goes economy. Oakite 198 is being used with water at concentrations between 1% and 5% by volume. It proves effective whether used in single or multi-stage washing machines.

To get more from your spray washer—ask Oakite. There's a complete line of materials to give you what you want in low unit cost cleaning alone—or combined with rust-prevention or paint-bonding phosphating. Send for Bulletin B-7484. Write Oakite Products, Inc., 58 Rector Street, New York 6, N. Y.

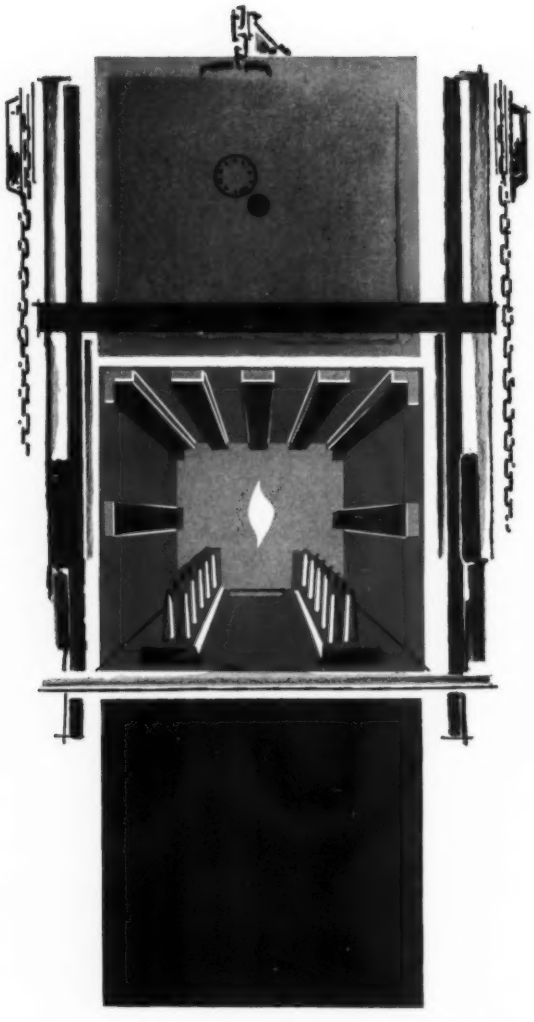
OAKITE
over 50 Est. 1909 SCIENCE
years' leadership in industrial cleaning

Oakite Special Protective Oil
A Polar Rust Preventive

This oil works by displacing water. Cleaned ferrous parts can therefore be dipped into a tank of Oakite Special Protective Oil right after the rinse. No drying needed. The oil film removes finger marks, does not stain the machined surfaces or change dimensions. It drains rapidly for economy, and disappears quickly with regular cleaning methods. Send for data sheet F-9835.

Oakite Steel Preserver safeguards metal indoors and outdoors

Onset of highly humid weather or lengthy exposures of ferrous parts to rusting conditions calls for the extra protection of Oakite Steel Preserver. It gives parts lasting and reliable protection during shipping and storage. Users find it far easier to apply and to remove than most permanent-type rust preventives. Send for data sheet F-9835.



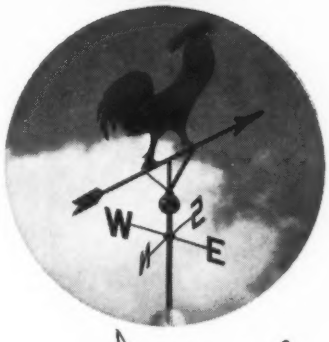
THE HEAT'S ON AT PEMCO. For a full half century, Pemco has concentrated the flame of research on the problems of better porcelain enamels, glazes and glass colors. Because of this continuing search with pilot plant equipment, many of the materials and processes you use today were originally developed by Pemco. Because the heat is always on, the materials you use in the future will also be Pemco developments.

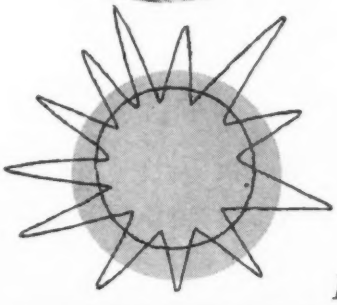
FIFTY YEARS OF RESEARCH AND A FLAME

PEMCO

BALTIMORE 24, MARYLAND

HIGH QUALITY PORCELAIN ENAMEL FRITS AND COLORING OXIDES





Sign of the Times...

Lead Specified for Color and Weather Resistance

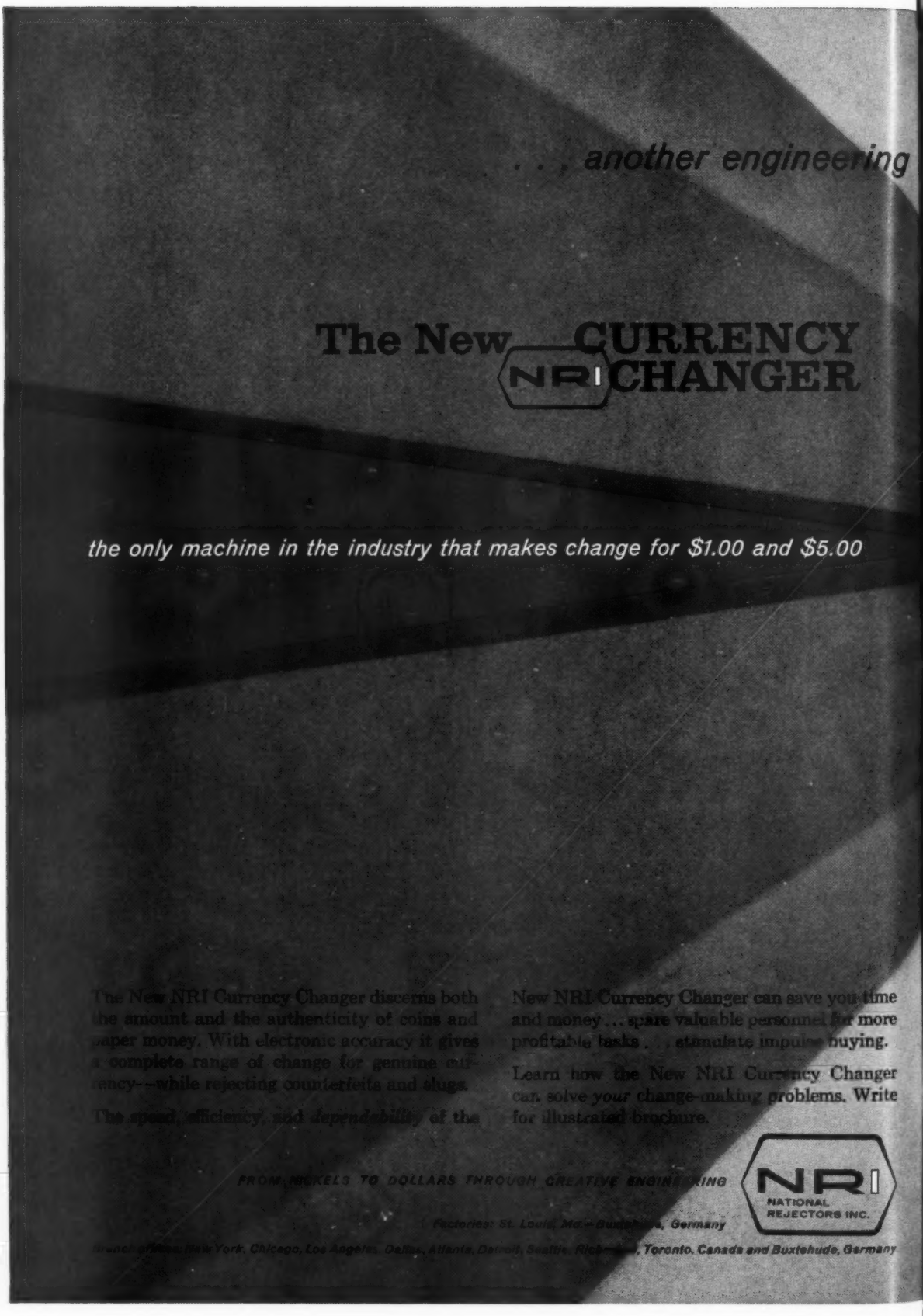
Porcelain enameled expanded metal by Ingram-Richardson Manufacturing Co.

Nothing subliminal about this new giant sequoia of the sign world—nearly 5000 square feet of display project its dramatic message. Engineered for beauty and durability, the sign's basic background material is expanded aluminum covered with porcelain enamel.

In the delicate process of porcelain enameling the expanded metal, lead proves to be the most satisfactory fluxing agent. Lead lowers an enamel's melting point, permitting it to be fused onto aluminum at temperatures low enough so that the metal remains stable. The enamel flows on smoothly and forms a thin acid-resistant, adherent surface or coating which allows cutting, shearing and punching after fabrication with little or no spalling or chipping.

Why not investigate the cost saving advantages of lead compounds for your products. Write for "Lead in the Ceramic Industries." Lead Industries Association, 292 Madison Avenue, New York 17, N. Y. 2892

LOOK AHEAD WITH LEAD


. . . another engineering
The New NRI CURRENCY CHANGER
the only machine in the industry that makes change for $1.00 and $5.00
The New NRI Currency Changer discerns both the amount and the authenticity of coins and paper money. With electronic accuracy it gives a complete range of change for genuine currency---while rejecting counterfeits and slugs.
The speed, efficiency, and dependability of the New NRI Currency Changer can save you time and money . . . spare valuable personnel for more profitable tasks . . . stimulate impulse buying.
Learn how the New NRI Currency Changer can solve your change-making problems. Write for illustrated brochure.
FROM NICKELS TO DOLLARS THROUGH CREATIVE ENGINEERING
NRI
NATIONAL REJECTORS INC.
Factories: St. Louis, Mo.; Buxtehude, Germany
Toronto, Canada and Buxtehude, Germany


breakthrough for NATIONAL
NRI

Superior Pre-Paint Protection Racks Up More Sales,

Paint Adhesion of Air Conditioning and Heating Registers, Grilles and Diffusers Insured by Granodine

Precision forming equipment turns coil stock steel into product at Krueger plant.

At major parts producer, Krueger Air Conditioning Corporation, registers, grilles and diffusers are treated with Amchem Granodine before painting to provide them with what Krueger officials agree is a "superior finish that extends the life of our products."

FINISHING PROBLEM SOLVED

Before selecting Granodine as their standard phosphating treatment, Krueger had tried several competitive processes but were unable to sustain the final quality or eliminate rust from painted products. The results—customer complaints and rejects running up to 10 percent of total production.

Today, after three years of utilizing Granodine in a five-stage dip phosphating process, Krueger, one of the world's largest manufacturers of registers, grilles and diffusers reports virtually no rejects, increased volume and an all-around better paint finish.

COMPARISONS SELL

To tell their superior finish story Krueger sets up effective side-by-side demonstrations of untreated products and products treated with Granodine at heating trade shows. Customer interest in such displays is high and has led to more sales through

Krueger management-manufacturing team: Left to Right—J. B. Smith, Vice-President of Production; President Leo Krueger; and Ted Kleckner, Vice-President and Comptroller.

# of Amchem GRANODINE* Fewer Rejects For Krueger

Operator employing electric hoist, lowers load of Krueger products into Granodine dip tank.

Paint line conveyor carries painted Krueger products from water-washer spray booth to inspection area.

graphic illustration of competitive advantages on Krueger's part.

Further support comes to Krueger through the use of Granodine when bidding for and successfully securing Government contracts and projects involving architects where rigid specifications exist for pre-paint finishing.

NEW SYSTEM PLANNED

Looking to the future, Krueger—with a 400 percent increase in sales over the last six years—is currently adding a new 10 acre, 100,000 square foot plant. High on the planning list is a new and virtually completely automated Granodine line. Amchem engineers have designed a unique conveyorized system utilizing overhead cleaning, rinsing and coating of Krueger products which will achieve significant cost savings and substantial reduction in gas consumption through a colder method in the clean-coat phase of the process.

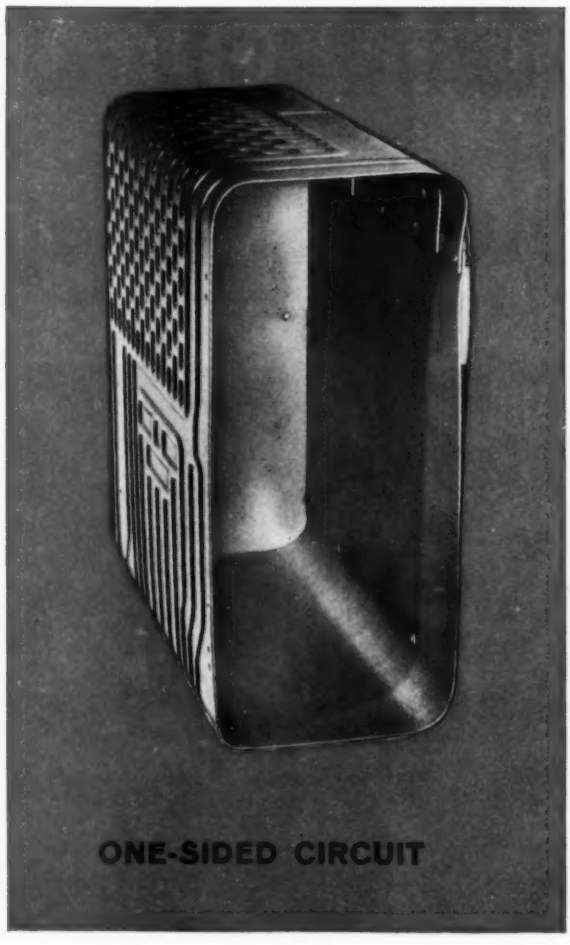
If you are interested in a *superior finish* for steel products—it will pay you to investigate Granodine, the *superior phosphating* process. Your local Amchem Representative can supply the details on how you can quickly and conveniently make the switch to Granodine without interrupting production or re-designing processing facilities, while providing a substantial increase in quality of product finish!

Write for Bulletin 1380B containing detailed information on Granodine for steel . . . the finish that lasts.

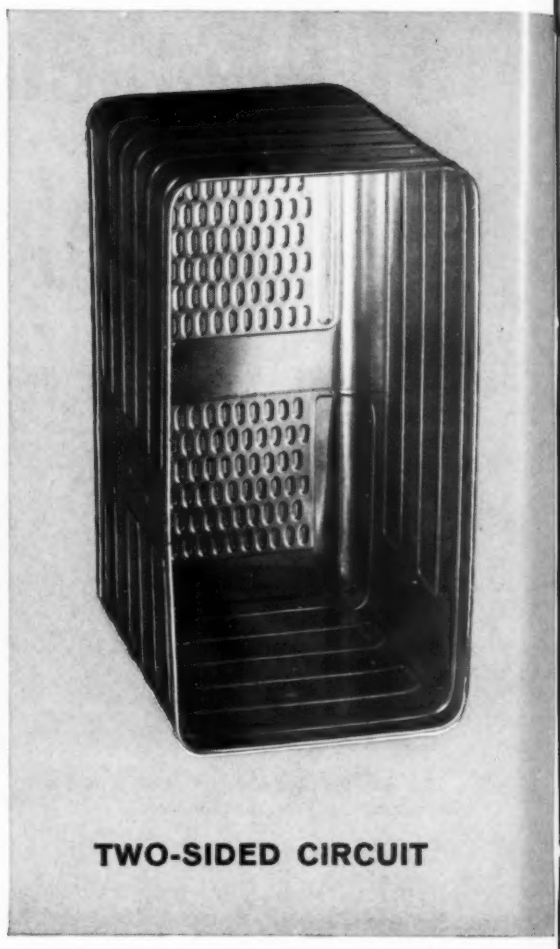
*Granodine is Amchem's registered trademark for the conversion coating chemical used to produce phosphate coatings on steel.

AMCHEM ® GRANODINE

Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • St. Joseph, Missouri • Detroit, Michigan • Niles, California • Windsor, Ont.



ONE-SIDED CIRCUIT



TWO-SIDED CIRCUIT

REYNOLDS ALUMINUM

. . . the design you want

Aluminum Tubed Sheet, developed by Reynolds only a few years ago, is now a standard material for refrigerator evaporators, as well as for many products in other fields. And no wonder.

This lightweight, rustfree sheet with the "built-in tubing" gives the designer complete flexibility in his circuit planning. It eliminates virtually all outside tubing, and many joining problems. It's compact, efficient, and dependable.

With Reynolds Aluminum Tubed Sheet, you can specify the exact circuit you want, the exact type of Tubed Sheet you need . . .

One-Sided Circuit—with passages expanded on just one side, leaving the other side flat.

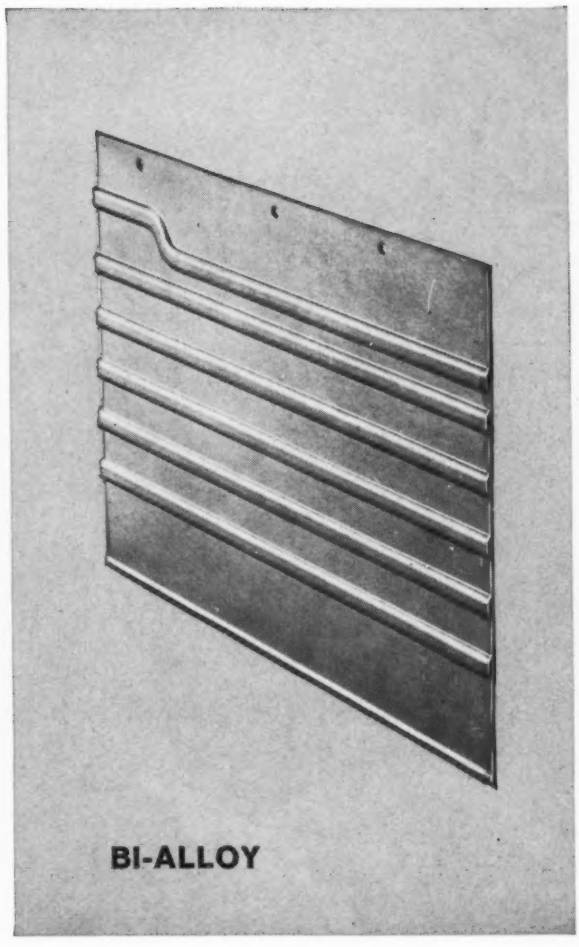
Two-Sided Circuit—with passages expanded on both sides of the sheet, providing larger tubing.

Standard Alloy—with both layers of the bonded "sandwich" sheet of the same aluminum alloy . . . this is the sheet most widely used by appliance manufacturers.

Bi-Alloy—with one or both layers of the bonded "sandwich" of an extra-strong alloy for surfaces that receive added wear, or where extra strength is required by product use.

Both Reynolds Standard and Bi-Alloy Tubed Sheet are available in one-sided and two-sided circuits.

With Reynolds, you have the added assurance



TUBED SHEET™

...the kind you want

of years of experience in fabricating Aluminum Tubed Sheet, plus Reynolds extensive facilities.

You'll find most of the leading makes of refrigerators use Reynolds Tubed Sheet for evaporators, but the applications of this material do not end there. Its flexibility, compactness, and efficiency are going to work in aircraft, electronic cooling devices, vending machines, and missile components, to name just a few uses.

For details on the properties, characteristics of Reynolds Tubed Sheet, or on Reynolds fabricating facilities, call your local Reynolds office, or write: *Reynolds Metals Company, P. O. Box 2346-AM, Richmond 18, Virginia.*

Watch Reynolds new TV show "Harrigan & Son", Fridays, starting October 7; also, "All Star Golf", Saturdays, resuming October 15—ABC-TV. And on Sunday, October 16, be sure to see the exclusive showing of-America's new 1961 cars on The National Automobile Show, direct from Detroit over CBS-TV, 6 to 7 P.M. EDST.

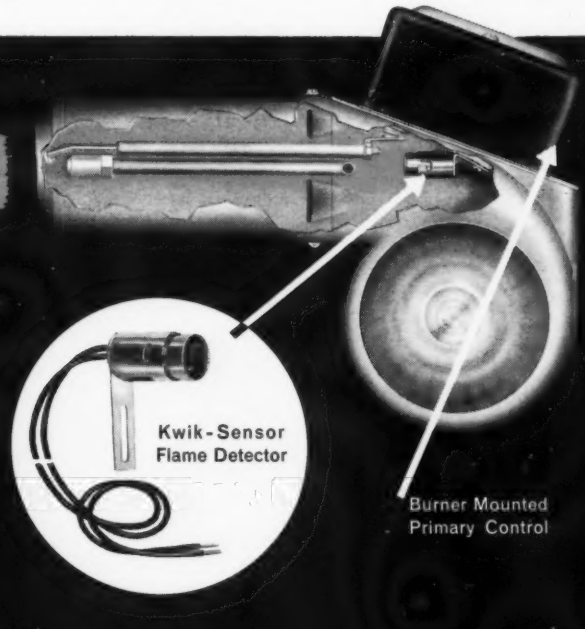
NEVER BEFORE an Oil Burner Control Like This!

KWIK-SENSOR

by

WHITE-RODGERS

Kwik-Sensor uses a new flame detector that makes possible the first practical burner-mounted control. Kwik-Sensor can be applied by the manufacturer to any domestic oil burner in minutes . . . no adjustments or relocation of the flame detector are necessary, even though the burner may be used in different types of furnaces or boilers, having various types of combustion chambers.



Fast, Simple Installation

The Kwik-Sensor flame detector need only be positioned to pick up the radiant rays of the oil flame. The primary control can be mounted in or on the burner, in the furnace or boiler vestibule, or in any convenient spot. No special engineering required.

Instantaneous Response

Unlike heat-sensing control elements that require a time interval to respond, the Kwik-Sensor is a flame-sensitive resistor which reacts *instantly* to flame ignition or extinction. It responds *only to the radiant rays from the oil flame.*

New Flame Detector Location

The Kwik-Sensor flame detector is mounted at the blower end of the burner assembly—away from the flame area. Here it operates in a clean, cool stream of air—unaffected by soot, dirt or heat, and where it does not disturb the primary air pattern or interfere with servicing of burner.

Complete Factory Wiring

Kwik-Sensor makes possible a *fully wired* furnace, burner or boiler unit . . . all quality controlled *in the factory*. This means production-line economies . . . simplified inventories . . . and the elimination of problems long associated with the many variables of in-the-field stack mounted control installations.

Write now for specifications, dimensions, wiring diagram, and additional facts.

Complete Control Package

Kwik-Sensor combines with new D'LUXline Thermostat of straight-line design to provide a perfect control package for domestic oil burners.

WR

WHITE-RODGERS

St. Louis 6, Missouri
1209 Cass Avenue

Toronto 8, Canada
611 Gerrard St. East

Precision production at Seeburg Corp.

RELIABILITY is the common denominator of all good coin-operated equipment, and adherence to this philosophy is keeping the Seeburg Corp. among the leaders in the industry.

A vending machine, whether the product is music or popcorn, must function efficiently and dependably in order to gain the respect and confidence of the customer. This makes dependability the big selling point. At Seeburg in Chicago, an elaborate quality control program has the job of making certain that the steady flow of products leaving the plant has built-in quality and endurance.

But maintenance of quality is not a task that is restricted to the quality control department. Working conditions, equipment and work procedures throughout the plant are conducive to "precision production." Although the building itself is old, many steps have been taken to keep the facilities up-to-date and working conditions pleasant. In the music box assembly department, for instance, the aisles are wide and clean and the work areas are brightly lighted. Background music from one of Seeburg's own units is played intermittently.

The company does not rely solely on talented personnel and pleasant working conditions to maintain top-line quality in its products. Modern test equipment is efficiently utilized in several steps of production as well as in a final checkout of all finished units.

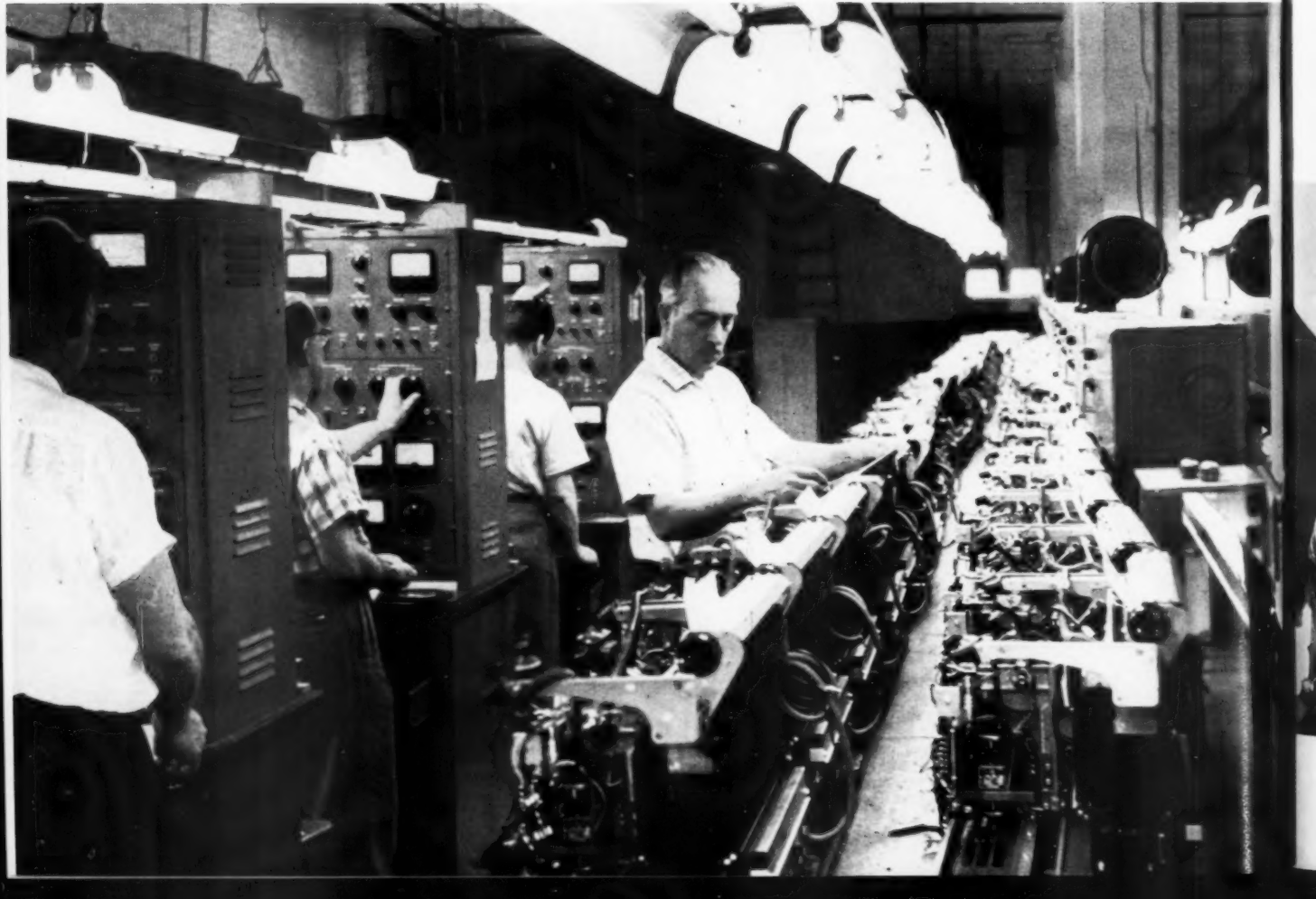
Despite the complexity of machines such as Seeburg's stereo music box ("juke box"), much of the test equipment was designed and built by the firm's own engineering department.

A good example is an automatic testing instrument that checks the electrical components of the selection receiver at the rate of 100 checks per minute. Designed and developed by the company's Test Engineering Department, the $10,000 "brain" automatically checks continuity, capacity of condensers, voltages and all operations at both high and low voltage. In case of defect, the instrument will stop and indicate the area of the trouble.

According to A. C. Kehoe, assistant vice president, assembly, the instrument does the work of four operators and has resulted in a 60-percent cost savings.

Another impressive testing device is estimated to do the work of 20 inspectors. Designated "Torrid Cora," the unit inspects tiny ferrite cores (torroids) and automatically separates the good from the bad. The torroids, which make up the "memory unit" in Seeburg's music boxes, are consumed at a 20,000-per-day rate.

Torrid Cora, designed and built by Seeburg at a cost of $75,000, segregates the torroids on the basis of electrical and mechanical tests. Accepted units are ejected into containers in lots of 1000. When the torroids are assembled into the memory unit, the entire unit is tested



(Below) — Record selector mechanisms lined up on long table for final inspection. All mechanisms are given a four-hour run-in test and final adjustments are made. All tests are controlled and analyzed from three electronic units at left. Mechanism assembly foreman Mike Priami (right) checks inspection card.

strict quality control, imaginative production methods pay off for expanding firm

ILLUSTRATED WITH MPM PHOTOS EXCLUSIVELY

Senior Vice President Fleming Johnson explains an intricate mechanism used in one of Seeburg's coin-operated machines.

Finished stereo music box shows results of careful finishing practice. Workman is making final appearance check prior to packing.

in another device. Result of these quality control precautions—a five-year guarantee on the memory unit.

Other quality control tests run on music box components include voltage and capacity checks on the audio amplifier, four-hour run-in tests on the record selector mechanism, and a 1200-volt safety check to meet standards of the Underwriters' Laboratory.

The full-line concept

Seeburg has long been known as a producer of music boxes, but today the company is much more. Under the leadership of President Delbert Coleman, steps have been taken to greatly expand the line of vending equipment.

Today Seeburg offers background music units (complete installations plus a compact unit for existing audio systems), coffee and hot chocolate dispensers, cold drink vendors (bottled and syrup-type), and music boxes (which account for about 20 percent of the company's business). This array of vending equipment is complemented by a line of insecticide fog applicators and by subcontracted work for Collins Radio and Western Union and a Sidewinder missile contract. The Western Union contract alone accounts for $2.5 to $5 million worth of business a year. At the present writing the company is also doing production engineering and manufacturing for American Photocopy Co.

But the firm's growth does not end here. Plans are being considered for the expansion of overseas markets, and a stereo phonograph, AM-FM radio set for the home is on the drawing boards. Candy and milk dispensers and an automatic ice maker are in the introduction stage.

The accompanying pictures tell the story of one phase of Seeburg production: the five-channel, high-fidelity stereo music box. A few photos also deal with cigaret vendor production. MPM editors feel this presentation illustrates how modern production and quality control techniques meet the demands of the coin-operated equipment industry.

Typical of the ingenuity exhibited by Seeburg engineers is a new shadow-free lighting system in tool room. Fixture over each machine contains six 40-watt fluorescent bulbs. The exterior of the fixture is chrome-plated, and a plastic honeycomb diffuser is attached to the bottom of the unit. The diffuser produces even, shadow-free lighting.

MPM wishes to thank the following Seeburg personnel for their assistance in the development of this story: Fleming W. Johnson, senior vice president; A. C. Kehoe, assistant vice president, assembly; and Carl Carlman, assistant vice president, fabrication.

metalworking

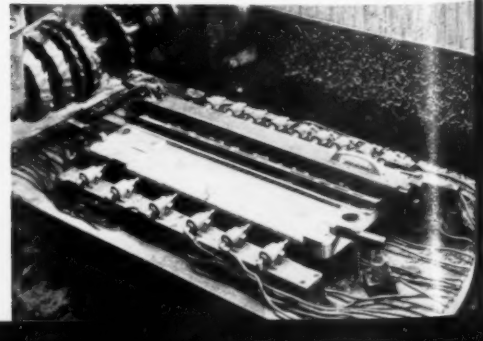
Fabricating and machining operations are carried out with a wide variety of equipment, including benders, spot welders, mills and multiple-spindle drill presses. The firm uses 40 presses ranging from a 250-ton model with a 72-inch bolster down to 25-ton models. Materials used in music box production consist of a high percentage of cold-rolled steel plus respectable quantities of brass, aluminum, stainless, and chrome plated stock.

(Above) — Two six-spindle drill presses are used to drill approximately 20 holes in main carriage frame of stereo music box. This equipment performs drilling operations that cannot be handled on nine-unit press line shown below and is also used to tap some 30 holes in the casting.

(Left) — A nine-unit semi-automatic drill press line, located next to the two six-spindle drill presses, drills 76 holes in the aluminum main carriage frame of the stereo music box. The new installation is capable of turning out 350 to 400 castings per two-shift work day, an increase in capacity of about 300 percent over the old method. Holes drilled range in size from 1/8 to 1/2 inch diameter, and are drilled automatically except for loading in the fixture and unloading.

(Lower Left) — Following forming in a bending brake, cigaret vendor and background music cabinets go to the spot welding department for further fabrication. Here the base and back of the cabinet are welded to the formed sheet. The department is equipped with five stationary spot welders and two overhead portable welders.

(Below) — A Seeburg designed-and-built milling fixture for music box aluminum base castings has cut rejects to one percent. The old method for securing the piece in the fixture involved hand tightening 24 clamps. Now a single lever controls 60 pneumatic clamps which instantly lock the piece in its proper position. The fixture is shown with casting clamped in place.



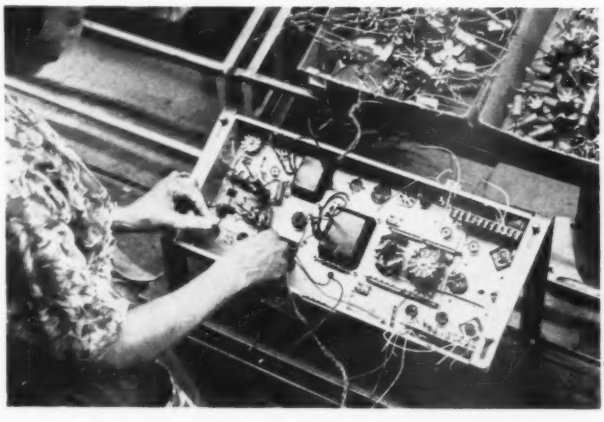
assembly

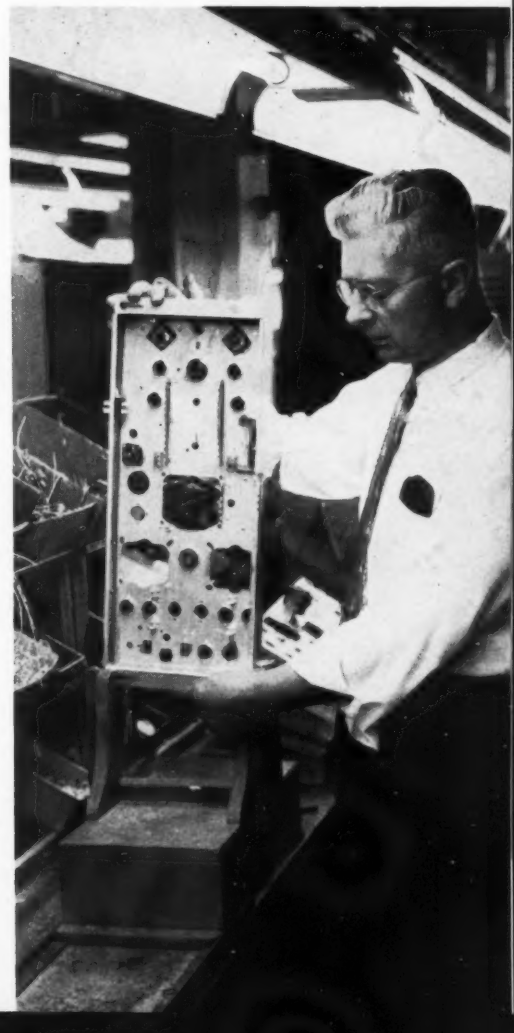
Sub-assembly operations on the music box are broken down into two major units: the record selector mechanism and the audio amplifier. These two units are moved to the final assembly area where they are assembled with other components in the cabinet to form the complete unit. The complexity of the assembly work requires well-trained employees working in an atmosphere that encourages precise working habits.

Clean, wide aisles and brightly lighted work areas promote high-level craftmanship in audio amplifier assembly department.

MORE ASSEMBLY PHOTOS ON NEXT PAGE →

(Below) — Assemblers add wiring, transformers, resistors, condensers, etc.





(Right) — Assembly Foreman Ed Iverson shows how chassis of audio amplifier is placed in work fixture to facilitate assembly. Sockets, chokes, etc., are already riveted in place.

(Left) — Inspector makes point-by-point check of completed unit.

(Center, left) — When visual check of audio amplifier chassis wiring and components is completed, tubes are inserted.

(Below, left) — Record selector mechanism, the major component in the music box, in final stages of assembly. The magazine and carriage assembly are clearly visible in this view. Power tools are employed wherever possible.

(Below) — Final assembly. Operator installs tubes and other components in rear door of cabinet. Selector mechanism is added following this operation

quality control

Seeburg has the equipment, the personnel and the motivation to do a quality control job that really controls. The photos shown here deal with quality control in music box manufacturing. Aside from individual tests of components, each completed unit is given a thorough check before shipment.

Through the use of modern electro-mechanical testing equipment, the likelihood of faulty equipment slipping through because of human oversight is practically negligible. Thus Seeburg strives to attain the characteristic most important to good coin-operated equipment—dependability.

First inspection stage of completed music box. Complete series of tests is made to insure that unit is in perfect operating condition. Test results are recorded on a detailed inspection card attached to top of unit.

Following assembly of the audio amplifier, an inspector uses an automatic testing instrument for a thorough checkout. The instrument checks voltage, response, distortion, and the action of the automatic volume control.

MORE QUALITY CONTROL PHOTOS ON NEXT PAGE →

(Right) — "Torrid Cora" inspects 6000 tiny ferrite cores (torroids) per hour. Designed and built by Seeburg, the testing device segregates the torroids on the basis of electrical and mechanical tests and ejects accepted pieces in lots of 1000. Test mechanism is partly visible at extreme right.

(Left) — Selection receiver is tested on instrument which performs 100 checks per minute. Designed and built by Seeburg, the instrument does the work of four operators and has resulted in a 60 percent cost saving.

Final checks being made on record selector "memory unit." A. C. Kehoe, vice president, assembly, holds memory unit in hand as girl puts another unit through a test with electronic equipment. Torroids are the heart of the memory unit.

(Above) — Cabinet Foreman Carl Freborg pushes completed music box into test booth for a 1200-volt test to meet the requirements of Underwriters' Laboratory.

(Below) — Additional tests being made on completed units. When these tests are completed the glass top is added to the music box and it is ready for shipment.

MUSIC BOX FINAL INSPECTION

MODEL _____ SERIAL NO. _____

1. TEST POSITION 1
- Coin Switches
- Plunger & Hdw.
- Lighting
- Key Operation & Appearance
- Elec. Sel. Compt.

2. TEST POSITION 2
- Selection
- Key Latching
- Latching Solenoid

3. TEST POSITION 3
- Credit Registration
- Credit Cancellation
- Nickels, Dimes, Quarters
- Half Dollars
- Canadian Nickels, Pennies

4. TEST POSITION 4
- Service Switch
- Pickup Landing
- Trip-off
- Motor Carryover Switch
- Stylus Clearance
- Safety Trip
- Record Reject Switch
- Selection Indicator
- Stylus Force
- Popmeter
- Pickup Mute
- Low Speed Operation

5. TEST POSITION 5
- Program Holder Latching
- Proper Titles
- Proper Pricing Windows

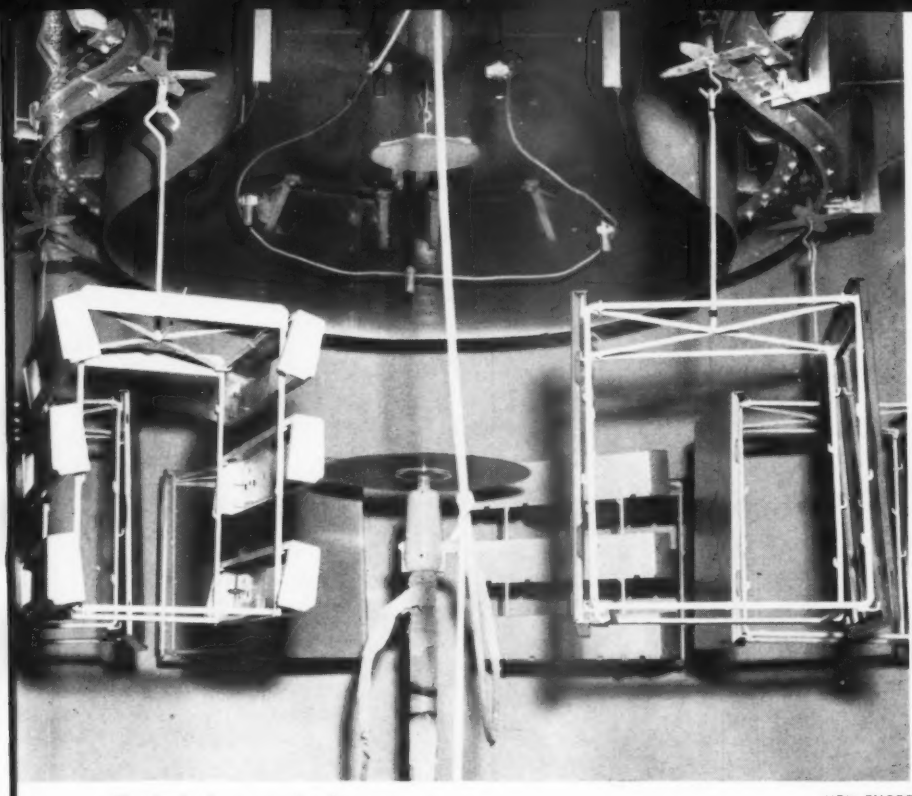
6. TEST POSITION 6
- Wall-O-Matic
- Casters

7. TEST POSITION 7
- Overall Gain
- Bass, Treble & Vol. Control
- Hum
- Tone Quality: Listening Test
- Low Frequency Speakers
- High Freq. Speaker
- Remote Speaker Operation
- A.V.C.
- Cabinet Feedback
- Cabinet Rattles
- Lighting

8. TEST POSITION 8
- Grille Assembly
- Rear Door
- Blocking
- Locks
- Grille Ornaments
- Lid Assembly
- Lock Keys
- Appearance, External
- Appearance, Misch. Compt.
- Casters
- Name Plate

9. TEST POSITION 9
- Voltage Breakdown

10. INSPECTION OK FOR SHIPMENT _____
- Blocked for Shipping by _____
- Finish OK _____



Typical electrostatic disc setup. MPM PHOTO

What's next for organic finishes?

a report on the upgrading of organic materials and finishing systems for home laundry appliances in the last 14 years, and a brief look at the future

by C. O. Hutchinson, • MANAGER — MARKET DEVELOPMENT, THE GLIDDEN CO.

A DISCUSSION OF WHAT TO EXPECT from organic finishes in the coming decade might logically be prefaced by a brief outline of the history of quality finishes for home laundry appliances since World War II.

In early 1946, the normal finishing system (organic) for laundry appliances was a hand-spray-applied, highly pigmented primer which was normally baked for 30 minutes at from 300° F. to 350° F. The topcoat was a hand-sprayed white enamel that also required approximately 30 minutes at 300° F. for baking. This finishing system, applied over phosphate-treated steel of the quality used at that time, would stand three cycles in the cycle alkali test, or equivalent of about 25 hours in a two percent soap-type washing product solution.

Resistance improved

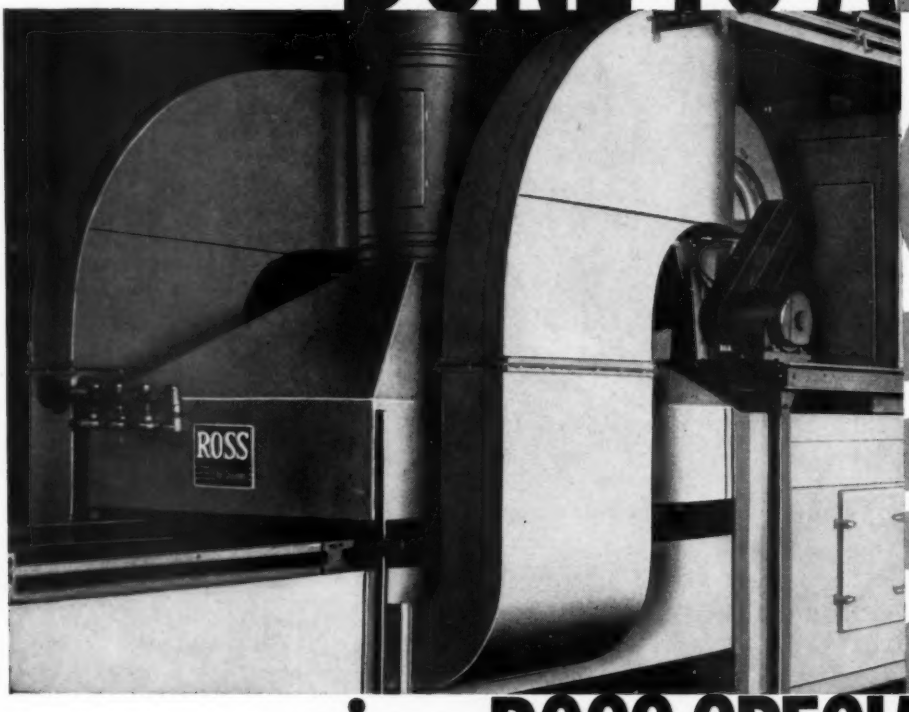
Within about one year, considerable interest was shown in upgrading the soap or detergent resistance of the finishing system, particularly on certain automatic washers, some of which were using painted water collecting tubs at the time. This improved system would stand 27 cycles in the cycle alkali test, or the equivalent of 75 hours in a continuous soap immersion at 165° F.

A few years later interest developed in reducing labor and the material losses caused by overspray. Experimental work on flow coating or dipping, tied in with the then newly-available epoxy resins, resulted in the development of gray epoxy primers for use in the laundry industry. These products, when flow-coat applied, gave a tremendous improvement in detergent resistance at thinner films than were required by the former primers. As might be expected, this process vastly increased the number of square feet of primed surface per gallon of primer. Despite the higher cost per gallon, the cost per square foot was greatly reduced.

Systems of this nature would take

Large detergent tester.

DONE TO A TURN in a ROSS SPECIAL OVEN



Paint Finishing · Metal Decorating · Rubber Curing
Strip Coating · Laminated Products · Material Drying

If yours is a product that needs to be baked or cured just so, you'll be happy as a clam with a ROSS Custom Oven. These ovens will meet performance specs on the nose... Ross Ovens will out-perform any other oven.

And ROSS can provide any and all types of ovens... Batch or Continuous, Straight-Pass or Multi-Pass, floor, overhead or tower, single-zone or multi-zone, one oven or a complete finishing line. ***Write today for Bulletin ID 300.***

M-R

J.O. ROSS ENGINEERING
A Division of Midland-Ross Corporation/730 Third Ave., New York 17, New York
ATLANTA • BOSTON • DETROIT • LOS ANGELES • SEATTLE • MT. PROSPECT, ILL.

	1946	1960
PRIMER:		
Material ¢/square foot	.9	.4
Number of sprayers	8	1
ENAMEL:		
Material ¢/square foot	2.0	1.0
Number of sprayers	8	2
TOTAL COST:		
Material ¢/square foot	2.9	1.4
Labor, etc.	3.0	1.0
	5.9	2.4
DETERGENT RESISTANCE		X 24

Cost data and resistance.

200 to 300 hours of continuous immersion at 165° F. in synthetic detergents. This general type of finishing system continued on through the late 1950's.

Enter acrylics

In 1959, the interest in so-called acrylic appliance finishes resulted in the development of acrylic primers and acrylic topcoats that could be applied as primers by flow coating and as topcoats by electrostatic application. This technique resulted in a tremendous upgrading in potential detergent resistance of the finishing system to something like 600 hours in continuous immersion at 165° F. in one percent detergent.

During this 12-year period, finish quality as measured by soap or detergent resistance, was improved 20 to 24 fold. Some might counter this claim with, "Yes, but the laundry appliance industry is paying a lot higher price per gallon."

Let's analyze the cost question.

Topcoats have increased about 30 percent in cost per gallon and primers have increased 50 percent. But it must also be remembered that, as a result of these quality improvements, the industry has demanded major changes in application techniques which have resulted in more efficient methods. This was in part possible through better quality uniformity of paint materials.

A detailed study of cost per square foot considerations in comparing 1947 materials and methods with 1960 materials and methods shows that 1960 cost per square foot is about 40 percent of 1947, even with the 30 to 50 percent higher cost per gallon.

The current picture

At the 1959 annual meeting of the American Home Laundry Manufacturers Association I drew the assignment to speak for four minutes on "Future Trends in Finishing." One of the predictions I made at that time was:

"One trend that may be a little farther off than others is the increased use, or at least the increased study and possible use, of the so-called acrylic enamels for use on laundry appliances. I refer to the one-coat enamels that are getting a great deal of publicity at the present time and which offer some possibility of quality improvement and perhaps cost reduction, depending upon the manufacturing system.

"I would not like to predict at this time that the one-coat acrylic finishes are likely to replace the primer and enamel of a two-coat system in many plants, unless radical changes in design and manufacturing methods are made to permit the applications of this one-coat system to all the areas that need protection. The product potentially can do the job, but from a production viewpoint, it does not appear that it is practical as a one-coat system for home laundry products, without radical cost increase."

A great deal of additional testing of acrylics has been conducted in the home laundry industry and there is now case history information on production use of two-coat, two-bake acrylic systems on laundry appliances.

And the future?

The Sixties will see an upgrading of finish performance on the product through:

—Increased study and possible adoption of acrylic finishing materials for laundry appliances.

—Upgrading of quality and quality uniformity of cleaning and preparation of metal.

—Increasing and controlling the minimum primer thickness.

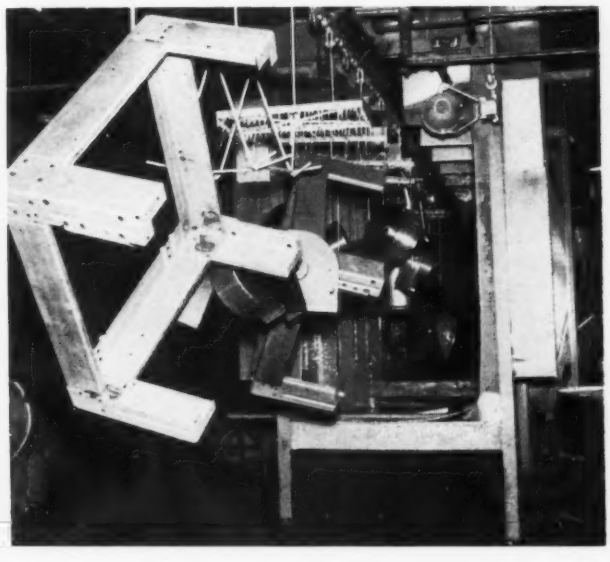
—Upgrading and improving uniformity of film thickness distribution of topcoat, and the permitting of harder, more brittle topcoats in order to obtain increased detergent and corrosion resistance.

Quality and quality uniformity in the Sixties can be improved in some areas through a mutual development and testing program involving a team consisting of representatives of the laundry appliance manufacturer and representatives from the finishing material supplier to mutually study, exchange information and upgrade performance.

Cooperative effort is a "must" in this area.

Sixty foot hand spray booth.

Flow coat line. MPM PHOTO



MPM

industry meetings

PRESSED METAL INSTITUTE

Pressed Metal Institute's Annual Meeting, Shawnee Inn, Shawnee-on-the-Delaware, Pa., October 10-14, 1960.

TOOL AND MANUFACTURING ENGINEERS

American Society of Tool and Manufacturing Engineers' Technical Seminar, Sheraton Towers, Chicago, Ill., October 11-12, 1960.

MAGNESIUM

The 16th Annual Convention of the Magnesium Association, Pick-Carter Hotel, Cleveland, Ohio, October 17-19, 1960.

METAL SHOW

Forty-second National Metal Congress and Exposition, Convention Halls and Bellevue-Stratford Hotel, Philadelphia, Pa., October 17-21, 1960.

PLUMBING, HEATING, COOLING

The Third Annual Membership Meeting of the Plumbing — Heating — Cooling Information Bureau, Americana Hotel, Bal Harbour, Fla., October 23, 1960.

INDUSTRIAL DESIGNERS

American Society of Industrial Designers 16th Annual Conference, Edgewater Beach Hotel, Chicago, October 27-28, 1960.

AUTOMATIC MERCHANDISING

National Automatic Merchandising Association's Annual Convention, Miami, Fla., October 28-November 2, 1960.

PAINT TECHNOLOGY

Thirty-eighth Annual Meeting of the Federation of Societies for Paint Technology, Hotel Sherman, Chicago, October 31 - November 2, 1960.

METAL TREATING

The First Metal Treating Symposium, New Englander Motor Hotel, Westport, Conn., November 3, 1960.

HOME LAUNDRY

The American Home Laundry Manufacturers' Association's Conference, San Francisco, Calif., November 3-4, 1960.

APPL. TECH. CONFERENCE

The West Coast Appliance Technical Conference, sponsored by the American Institute of Electrical Engineers, Los Angeles, Calif., November 7, 1960.

DIE CASTING

First National Die Casting Exposition and Congress, Detroit Artillery Armory, Detroit, Mich., November 8-11, 1960.

HEATING & AIR CONDITIONING

The 47th Annual Convention of the National Warm Air Heating and Air Conditioning Association, Statler-Hilton Hotel, Cleveland, Ohio, November 14-16, 1960.

ELECTRICAL MANUFACTURERS

The National Electrical Manufacturers' Association's Annual Meeting, Hotel Traymore, Atlantic City, N. J., November 14-18, 1960.

SHOP PRACTICE FORUM

Porcelain Enamel Institute's Shop Practice Forum, Urbana-Lincoln Hotel & University of Illinois, Urbana, Ill., November 16-18, 1960.

(More Meetings on Page 94 →)

Greater Mileage
Heat Stable
Non-tarnishing

bronzeless gold

A finer, softer, richer metallic spray finish of top-grade appliance quality for metals and plastics, simulating the appearance of fine bronze powders with better handling ability and non-tarnishing properties . . .

Now Available in Two Systems for Metals and Plastics

1 For Metals and Thermosetting Plastics

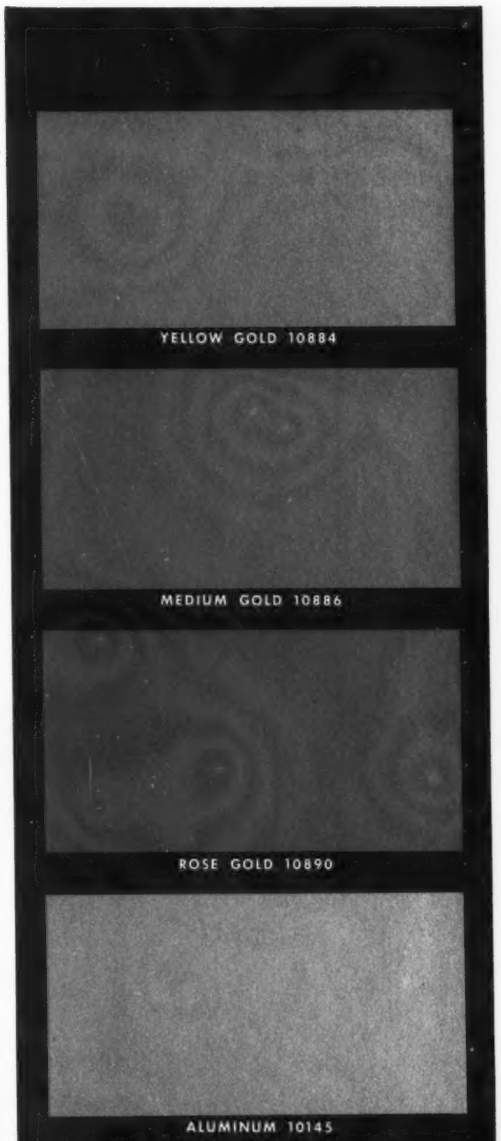
The handling ability and color control of Bronzeless Gold in LOGO W-111 spray baking finish for metals and thermosetting plastics far surpasses normal baking finishes mixed with bronze powders. Bronzeless Golds in W-111 are exceptionally hard and mar-resistant, possess superior stain resistance, impermeability and durability; they eliminate use of protective, clear top coats. Adhesion is excellent on zinc die castings with no pretreatment other than normal cleaning.

Bronzeless Gold W-111 can be applied by hand or automatic spraying and with most electrostatic spraying equipment. Baking time recommended for achieving the coatings' maximum properties is 300° to 325° for 30 minutes.

2 For Thermoplastics

Bronzeless Gold supplied as a spray finish in the LOGO R-222 system has fast drying properties along with toughness, good abrasion resistance and excellent durability. For normal application, a three to five minute touch dry and a 20 to 30 minute pack dry can be expected. Even with this speed, Bronzeless Gold R-222 has excellent leveling and flow out characteristics.

Bronzeless Gold R-222 withstands 1,000 hours in a humidity cabinet at 110°F. and 100% R.H. with no softening, blistering or loss of adhesion when applied on polystyrene as recommended.



Matched Colors Are Available on Request

● Bronzeless Golds are supplied in liquid form, heavily pigmented and concentrated for thinning in a ratio of 1 part Bronzeless Gold to 2 parts thinner. There's no need for weighing powder and mixing dry materials; settling of powders, as experienced with bronze powders, is eliminated. Consistent color is always obtained when recommended proportions of thinner are used.

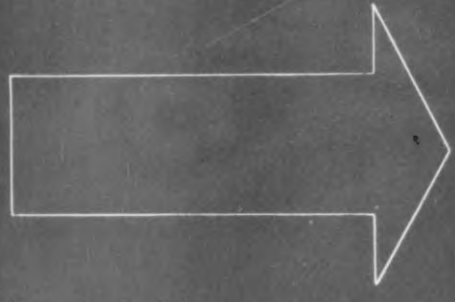
See Reverse Side for Special Trial Offer ⇨

Bronzeless Golds are used by these leading appliance manufacturers

Take Advantage of the Special Trial Offer Now

Prove the value and economy of Bronzeless Golds on your product. See why these leading manufacturers are specifying the unique, rich appearance of Bronzeless Golds.

Bronzeless Golds are used by these leading appliance manufacturers



Take Advantage of the Special Trial Offer Now

Prove the value and economy of Bronzeless Golds on your product. See why these leading manufacturers are specifying the unique, rich appearance of Bronzeless Golds.

bronzeless golds

are supplied in liquid form, ready for thinning. They spray easily by hand, automatic spraying and with most electrostatic spraying equipment. Long term storage will not result in gellation, livering or color change.

Color matches to your specification are available on request. Color matching is handled in the modern facilities of the Color Laboratories of Bee Chemical Company (with over 15 years of experience in color matching for the appliance and automotive industries).

Use the coupon below and take advantage of the special trial offer now available on Bronzeless Golds. Specify type of surface and end use properties required for your application. (Bronzeless Golds are not recommended for outdoor application).

More than one color may be ordered on the same trial basis.

TO:
BEE CHEMICAL COMPANY
LOGO DIVISION
2700 E. 170th Street, Lansing, Illinois

MPM

Enter our order for an initial quantity of Bronzeless Gold at the special trial offer price checked below:

☐ 1 Gal. of Bronzeless Gold No. _____ and 2 Gal. of Thinner — @ $7.50 FREIGHT COLLECT

☐ 5 Gal. of Bronzeless Gold No. _____ and 10 Gal. of Thinner — @ $35.00 FREIGHT PREPAID

The Bronzeless Gold will be applied to (type of surface and end use):

_____

_____

_____

Name _____

Position _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

Phone _____

bronzeless golds specified by leading appliance manufacturers

bronzeless golds are supplied in liquid form, ready for thinning. They spray easily by hand, automatic spraying and with most electrostatic spraying equipment. Long term storage will not result in gellation, livering or color change.

Color matches to your specification are available on request. Color matching is handled in the modern facilities of the Color Laboratories of Bee Chemical Company (with over 15 years of experience in color matching for the appliance and automotive industries).

Use the coupon below and take advantage of the special trial offer now available on Bronzeless Golds. Specify type of surface and end use properties required for your application. (Bronzeless Golds are not recommended for outdoor application).

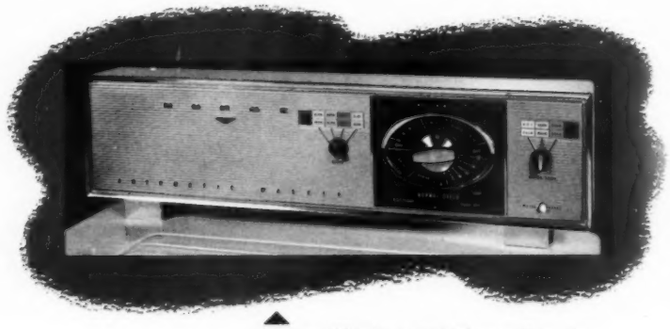
More than one color may be ordered on the same trial basis.

Armstrong Furnaces

Armstrong Furnace Company of Columbus, Ohio, uses Bronzeless Yellow Gold finish on panels for their highly stylized Gas-Fired Up-Flow 700 Series Furnaces. Bronzeless Golds give a soft, rich appearance to these home heating units and have the necessary heat stability and durability required by the manufacturer.

Motorola Television Bezels

Motorola, Inc., has used Bronzeless Gold—R222 on the thermoplastic bezel of their 21" model television sets—indicating the durability of Bronzeless Golds in daily use. A single coat of Bronzeless Gold without a protective clear top coat gave Motorola the desired striking appearance and the required rugged surface.



Norge Washer and Dryer Panels

Norge Division of Borg-Warner Corporation uses Bronzeless Gold W-111 on Timer Bezel and Control Panels of 1960 model Norge washers and dryers. Finished for Norge by Croname, Inc., of Chicago, the zinc die cast panels receive one coat of Bronzeless Gold. No protective top coat is necessary.

Chatleff Valves

Chatleff Controls, Inc., Austin, Texas, uses Bronzeless Yellow Gold finish on their control valves for summer-winter air conditioning units. This manufacturer reports important economies compared to production time previously spent measuring bronze powders and mixing with lacquer.

Zenith Television Bezels

Zenith Radio Corporation uses Bronzeless Gold W-111 for their zinc die cast TV bezels. They put the coating through Zenith's "shaker" test on a vibrating machine which duplicates transporting the bezels in cartons for approximately 2500 miles of rail transit. The abrasive power of the cardboard liners had no effect on the coating.

General Electric Toasters

General Electric takes advantage of the heat stability of Bronzeless Golds on the phenolic ends of new model GE toasters. The Rose Gold finish, automatically sprayed without priming of the phenolic parts, complements the anodized aluminum selector panel directly below it.

TO:
BEE CHEMICAL COMPANY
LOGO DIVISION
2700 E. 170th Street, Lansing, Illinois

MPM

Enter our order for an initial quantity of Bronzeless Gold at the special trial offer price checked below:

☐ 1 Gal. of Bronzeless Gold No. _____ and 2 Gal. of Thinner } @ $7.50 FREIGHT COLLECT

☐ 5 Gal. of Bronzeless Gold No. _____ and 10 Gal. of Thinner } @ $35.00 FREIGHT PREPAID

The Bronzeless Gold will be applied to (type of surface and end use):

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

Phone _____

Form No. BG60

Printed in U.S.A.

A Product of Research by

Bee Chemical Company

2700 E. 170th STREET
LANSING, ILL. GRanite 4-7000

Hartford, Conn. CHapel 9-7691 • Charlotte, N.C. FRanklin 6-6873 • Los Angeles, Calif. FAculty 1-4411

Fabricating the aluminum base alloys

by Lester F. Spencer • METALLURGICAL ENGINEER

PART II DEEP DRAWING AND SPINNING

IT IS ASSUMED that the process of drawing metals, and the reaction and flow of metal during forming to various shapes, is known. Thus, the data necessary is that which will assure the satisfactory working of aluminum. Although single-action mechanical presses are satisfactory for shallow drawn parts, the double-action mechanical or hydraulic press is preferred for the forming of relatively-deep shells. Frictional surfaces, such as dies, blankholder faces, and draw-die radius should have the finest surface finish possible.

Form drawing

The drawing speed will be determined by the shape of the part and the draw depth; however, another factor to consider is the relative ductility of the alloy formed. As a guide, relatively-deep drawn parts made from a ductile alloy should, with properly designed tooling, draw successfully at a maximum ram speed of 100 feet per minute. The less ductile alloys may require a ram speed of only 30 feet per minute. Blank holding pressures must be determined experimentally for each specific job; this value should be sufficient to prevent the formation of excessive wrinkles. An adjustable blank holding pressure is preferred, this being readily accomplished when multiple-action or cushion presses are used. In single-action presses, blank holding pressure can be applied under spring loading or by rubber pads.

Sufficient clearance between punch and die should be given so as to permit free metal flow between the tool surfaces. Insufficient clearance may cause pinching and subsequent fracture. It may also permit stretching of the side walls of a drawn shell which may also lead to fracture of a thinned wall. In the drawing of cylindrical, square, and rectangular shapes, the following suggested formulae can be used as a guide, thus:

A. Cylindrical shells

First draw die size= punch size + 2.2 x blank thickness.
Second draw die size = punch size + 2.3 x blank thickness.
Third and subsequent draw die size = punch size + 2.4 x blank thickness.
Sizing operations — draw die size = punch size + 2.0 x blank thickness.

B. Square and rectangular shells

First draw die size = punch size + 2.2 x blank thickness.
Second and subsequent draw size = punch size + 2.2 x blank thickness.
Final draw die size = punch size + 2.0 x blank thickness.

Where the shear strength of an aluminum alloy is higher than the yield strength, the punch and draw die radii should be 4 times the blank thickness. Where the shear strength is lower than the yield strength, this minimum radii should be increased proportionally; the maximum value should not exceed 12 times the metal thickness, especially for thicknesses up to 0.125 inches.

Blank development is a matter of common knowledge among pressmen and need not be repeated. The number of operations required to produce a drawn shell is determined by the difference in dimensions of the blank size and the size of the finished part. The amount of reduction per reduction is dependent upon both the alloy type and the temper; the annealed temper being employed for deep drawing operations; tempered material, up to a medium degree of hardness, can be used for shells requiring more than one operation; whereas harder tempers are used where a single operation is used. Recommended reductions are given in Table 1 for forming cylindrical shells. An example of the required operations, including the final draw prior to trim-

Table 1 — Suggested Reductions in the Drawing of Cylindrical and Rectangular Shells

A. CYLINDRICAL SHELLS

Material Type or Class	Thickness of Material — Inches			
	0.125 & Up		0.020 to 0.125	
	First Draw*	Redraws**	First Draw*	Redraws**
'O' (Annealed)	0.55 to 0.58	0.72 to 0.80	0.58 to 0.60	0.78 to0.85
'H12', 'H32' (Quarter-Hard)	0.64 to 0.66	0.85 and Up	0.66 to 0.68	0.85 and Up
'H14', 'H34' (Half Hard)	0.68 to 0.72	0.85 and Up	0.72 to 0.75	0.85 and Up
'H16', 'H36' (¾ Hard)	0.75 to 0.78	—	0.78 to 0.80	—
'H18', 'H38' (Full Hard)	0.75 to 0.78	—	0.78 to 0.80	—
2024-T3, 7075-T6, 6061-T6, Alclad 2024-T3, 2014-T6, Alclad 7075-T6,	0.75 to 0.78	—	0.78 to 0.80	—
6061-T4, 2014-T3	0.68 to 0.72	0.85 and Up	0.72 to 0.75	0.85 and Up

Note: *Blank size multiplied by given factor; **Previous draw size multiplied by given factor; Multiple drawing, while possible by reducing the amount of reduction between operations, is not recommended for H16, H36, H18, H38, 2024-T3, 7075-T6, 6061-T6, Alclad 2024-T3, 2014-T6 and Alclad 7075-T6.

The minimum and maximum reduction values given above can be used in relation to the workability classification using the smaller figure for the material rated Class 1, an intermediate figure for Class 2, etc.
It should be remembered that the thinner the material, the more difficult it becomes to draw it successfully without rupturing.

ming and beading to produce a completed shell from 3003-0, is given in Fig. 1.

The number of reductions to obtain a square or a rectangular container is difficult to estimate. Although the vertical corner radius is of importance, blank development and tooling are considered as being more critical. Thus, since actual drawing occurs in the corner areas of a starting blank, it is necessary to have an excess of metal in these areas to obtain the required blank holding pressure. As the metal flows into the corners during forming, it is under a high compressive stress; stress relief in these areas being realized by the ability of the side walls and ends of the shell to accommodate a portion of this metal flow. Generous spherical radii at the corners of the punch will permit an increase in the depth of draw. Although maximum depths, along with minimum corner radius, will vary appreciably, there are suggested values for fully annealed material ('O' temper) in accordance to the formability index, thus: (a) Class 1 material — maximum depth of draw equals the width of draw times 0.75, whereas, the minimum corner radius is equal to the depth divided by 7; (b) Class 2 material — maximum depth of draw equal to the width of draw times 0.70, whereas the minimum corner radius is equal to the depth divided by 6; (c) Class 3 material — maximum depth of draw equal to the width of draw times 0.65, whereas, the minimum corner radius is equal to the depth divided by 5; and (d), Class 4 material — maximum depth of draw equal to the width of draw times 0.60, whereas, the minimum corner radius is equal to the depth divided by 4.

In square or rectangular shell drawing, the shell shapes on cup and redraws should be planned so that there is a minimum of reduction or flow in the corners. Usually, the initial drawpiece is cylindrical in shape; the first re-draw piece may have a square shape with bulging sides; and the second re-draw or final shape would have the required dimensions. Although the annealed temper is recommended for deep drawing operations requiring two or more operations, quarter-hard material can be used providing the reductions are not severe. It must be remembered that aluminum alloys, which react very similarly to many other materials, will work harden; a generalized statement can be given in that for every drawing operation, the properties of the material are comparable to that obtained of a material ¼ temper higher. This guide can be used in determining the position of intermediate anneals.

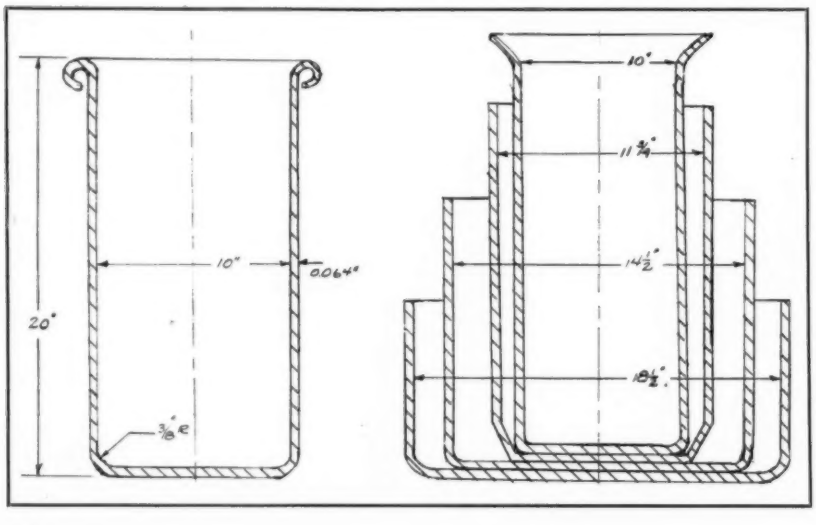
An ironing operation is performed on shells where heavy bottoms and relatively-thin sidewalls are desired. The amount of sidewall reduction obtainable in a single operation is dependent upon the degree of cold work within the sidewall prior to the ironing operation. Where the sidewall is equivalent to an 'O' temper, this reduction may be as high as 40 per cent. For less ductile materials, this reduction is reduced proportionally. Thus, it very frequently is economical to anneal prior to ironing so as to obtain this maximum reduction in ironing.

In spite of all precautions that are taken in deep drawing, difficulties such as wrinkling, buckling, and fracturing may be encountered. In an analysis of these frequently-encountered difficulties, there have been summarized the possible causes for the failure. Thus, wrinkling may be caused by one or more of the following: lubricant too heavy, insufficient blank-holding pressure, excessive metal clearances, and incorrect blank development. Where buckling is experienced, possible causes may include: material too thin, too much metal out of control, excessive metal clearances, and die radius too large. In the event of fracturing of the shell, one or more of the following causes may be the culprit: poor lubrication, excessive blank-holding pressure, tool radius too small, reduction too great, insufficient metal clearances, material too thin, wrong choice of material or material of poor drawing quality, punch off-center with the die, drawing surfaces of tools poor, blank larger than die or blankholder, and deep scratches or imperfections in the metal.

Table 2 — Recommended Speeds in Spinning the Aluminum Alloys

Blank Diameter, In.	Thickness of Metal	Temperature of Metal, deg. Fahr.	Lathe Speed, rpm
36 to 72	3/16 to 3/8 in.	400 Max.	50 to 250
24 to 36	12 ga. to 3/16 in.	Room	250 to 550
12 to 24	20 to 12 ga.	Room	400 to 700
Up to 12	20 to 16 ga.	Room	600 to 1,100

DRAWING COURTESY REYNOLDS METALS CO.



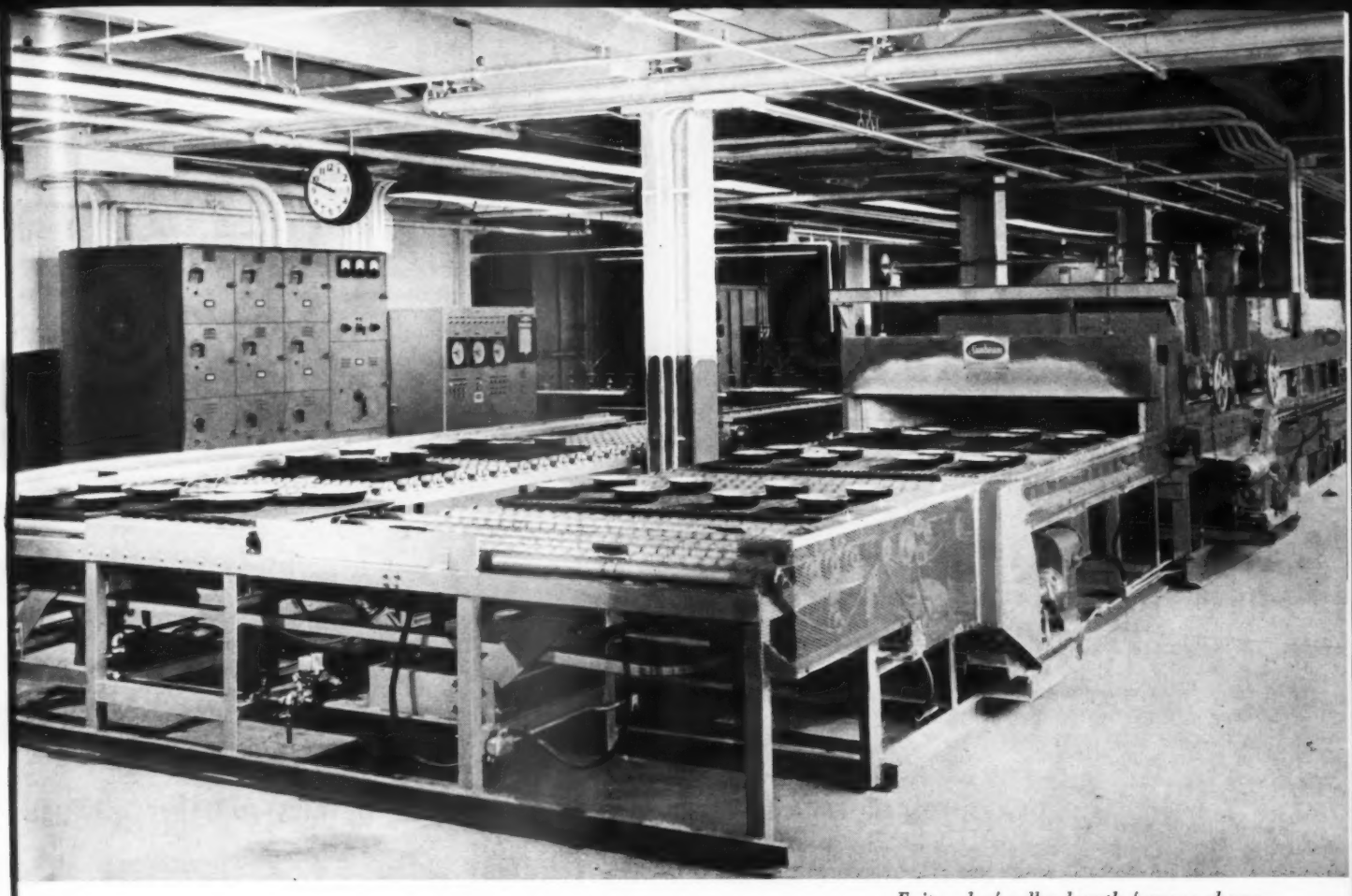
Bulging

This method of forming is particularly adapted for parts of re-entry shapes; the maximum bulging of fully-annealed material being approximately a value equal to the per cent of elongation. Thus, the diameter of a press-drawn shell can be increased about 35 per cent for 1100-0 material, whereas it would be about 17 per cent for the higher alloyed material. 7075-0. Segmented steel punches, hydraulic pressure, and rubber bulging punches are the methods employed; the latter type being the more common method used.

Necking

This is another operation frequently

to Page 101 →



Exit end of roller hearth furnace shows loaded trays emerging in pairs. The load is indexed so that the conveyor at left carries the trays in a single line. The furnace and conveyor control station is visible at the extreme left.

Cast iron cookware production goes modern

AN MPM STAFF FEATURE

MECHANIZED HANDLING of cast-iron cookware has become a reality in the plant of Textile Machine Works, where "Prizer-Ware" is cast in the foundry and then finished in a clean, compact porcelain enameling department designed specifically for the purpose.

Foundry facilities

Castings for Prizer-Ware are of gray iron. They range in weight from 13 ounces for a trivet to 31 pounds, 3 ounces for the largest charcoal grill. Because of the relatively thin walls of the cookware (less than 1/10-inch thick), great care is used to produce exact uniformity of thickness throughout the pot or pan to insure uniform heat distribution for cooking. Textile has installed a mechanized molding unit to increase quantity and quality with the least amount of physical effort. This unit provides straight-line mechanized production methods from the handling of the sand, molding by a machine, pouring while "on the move," to the finished casting.

The products

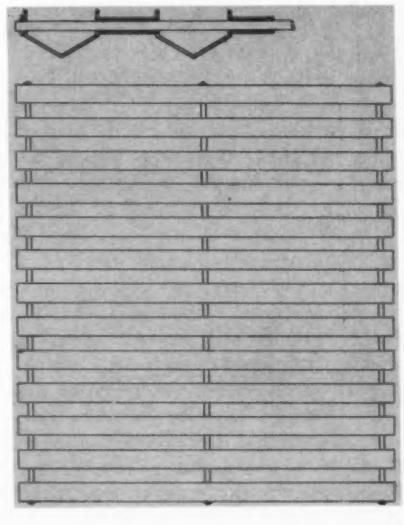
The Prizer-Ware line includes saucepans, skillets, casseroles, Dutch ovens, divan dishes, roasters, broiling platters, griddles, trivets, "sandwicher" (small square skillet), and charcoal grill. Skillets and saucepans are available with and without wooden handles; covers are interchangable.

The ware is available in orange-red, turquoise, and white with applied ivy decoration.

Compact layout

The porcelain enameling facilities are housed in an area of only 10,800 sq. ft. The layout is planned to take full advantage of every possibility for mech-

Drawing of tray which forms part of the furnace installation. They are located on a return conveyor parelleling furnace.



In the Textile Machine Works mechanized foundry installation, 27 individual air-actuated molding stations are located in dual production lines. An air-foot-operated gate supplies sand to molds and air-operated, jolt-squeeze molding machines. Each hopper station holds a ton of sand.

anized handling and, as a result, a total work force of only 12 men completely controls the operations of an enameling plant capable of turning out 2500 or more finished pieces per eight-hour shift.

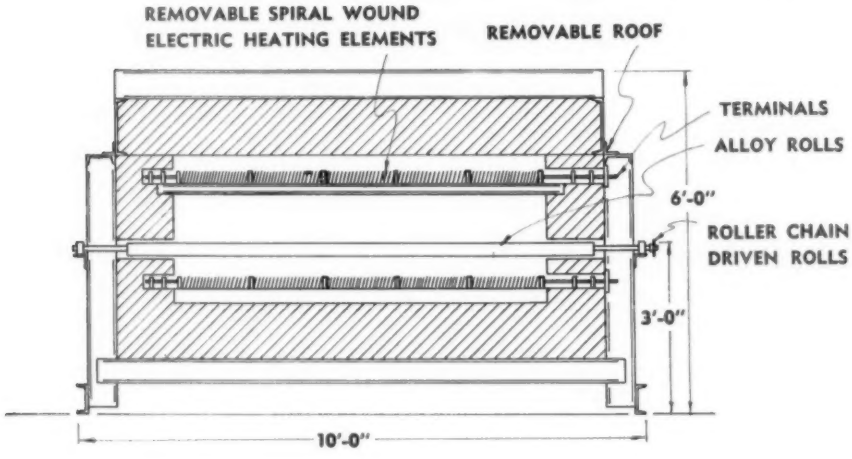
Enamel preparation

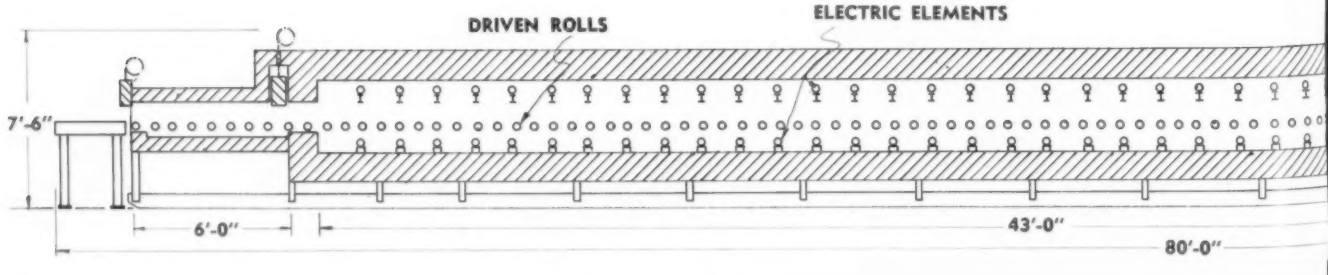
A one-coat system of application is used, employing lead-free enamels that mature in the range of 1300-1400° F. Five mills are used for preparing the various enamel slips to meet color and specialty finish requirements. The company's "blue-mist" finish represents one of the specialty finishes whereby the effect is gained through the combined milling of contrasting colors, as contrasted with the spray method of getting two-tone effects.

The enamel is normally milled to two to three percent on a 200-mesh screen. The slip then goes through a magnetic separator and sieve, and then is loaded into agitated stainless steel storage tanks. The magnetic separator, flat sieve, and pump are mounted on a portable truck for serving the various mills.

From the storage tanks, the porcelain enamel is delivered by gravity into

DRAWINGS OF FURNACE SHOWING CONSTRUCTION DETAILS AND INSTALLATION OF





Textile Machine Works of Reading, Pa., maintains complete design, production and inspection facilities for contract metalworking operations of every description for both light and heavy industry. The company's foundry is represented as the largest gray iron foundry in the world under one roof. The foundry features straight-line production facilities that are thoroughly mechanized. Its capacity is over 100 tons of gray iron daily.

The TMW plant covers 57 acres and has over a million square feet of manufacturing floor space. Present employment is in excess of 3000, and the company backlog of orders is $10.75 million.

Five-year diversification program

With Louis R. Thur as chairman of the board and El Roy P. Master as president, the company has completed a five-year program of diversification, which leads us to the subject of the accompanying article, based on "Prizer-Ware."

In 1959, the line of colorful porcelain cast-iron cookware was obtained from Prizer-Painter Stove Works at Reading. New specialized equipment for the production of this consumer houseware and giftware product has been installed by the Foundry Division of TMW, of which this new product is now a part.

Equipment and production details for the production of Prizer-Ware are presented in the accompanying editorial feature.

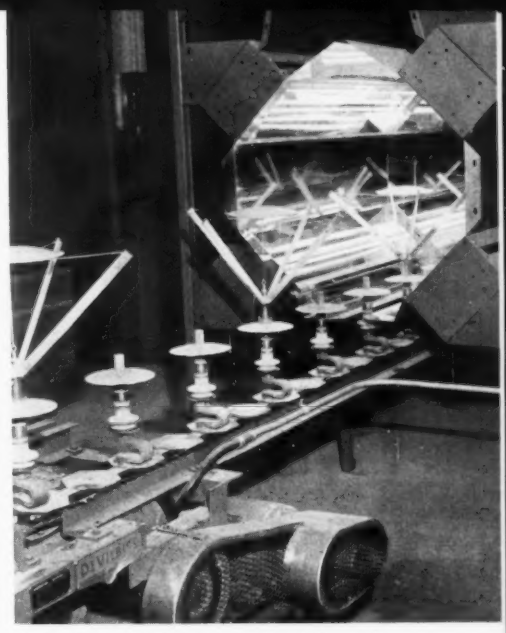
pressure tanks and adjusted to proper consistency for the spray line. The control laboratory forms a part of the mill room setup.

Complete mechanization

Mechanization in the porcelain enamel plant starts from the time the clean castings are delivered in tote boxes by fork lift truck from the foundry. The castings are immediately loaded onto a spindle-type chain-on-edge conveyor which serves the automatic spray equipment. Workholders are especially designed for the various parts. Some are made from spiral saw blades. Two adjoining spray booths are equipped with six automatic spray guns each. In the first of the two booths the inside of the ware is sprayed, and in the second booth the exterior coating is applied, so that both can be fused with a single fire.

The automatic booths are equipped with a "skip-spray" mechanism which provides for spraying *only* when there is ware on the workholder in front of the guns. Provision is made for using any number or combination of guns depending upon the size and shape of the ware.

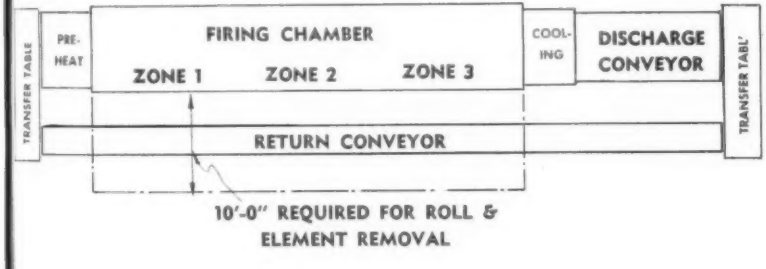
As the ware leaves the second of the two "automatic" booths, it travels through a hand spray booth for manual shading or touchup as required. Much of the ware does not require touchup, but an expert sprayer serves as both an inspector and application man. This is a definite requirement on handles and some parts of unusual shape which do not normally get a uniform inside and

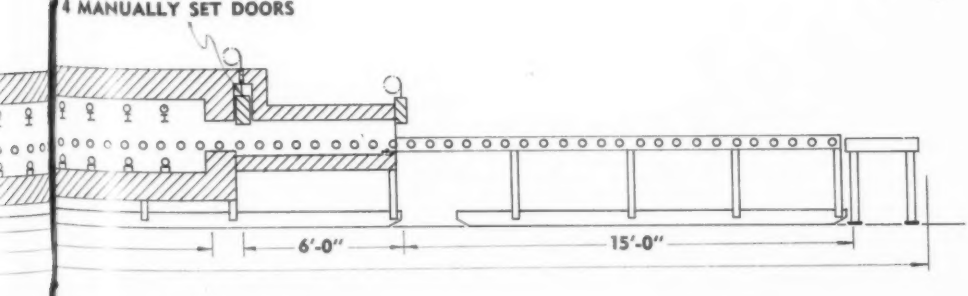


This view of the exit end of the infrared dryer shows the specially designed spindle conveyor units used to support the castings. The individual spindles are designed to turn the ware in spray booths and through the dryer for uniform application and drying. Each unit is individually shielded to protect the conveyor from abrasive slip. The circular shields visible in photo prevent water from dripping onto the chain when the conveyor passes through the work holder washer.

ION OF HEATING UNITS

DRAWING COURTESY SUNBEAM EQUIPMENT CORP.





outside coating in the automatic booths.

The ware is passed immediately into a 22-foot-long infrared dryer. The connected load for this dryer is 72 kw. The heat is developed by 24 3000-watt quartz lamps. This dryer is designed for flexibility, in that the rating can be dropped to as low as one-third the 72 kw in the event that small parts (light loads) require this change. The reflectors within the infrared dryer are so located that an even distribution of radiant heat is received by the ware on all surfaces.

A brushing station is located at a point between the exit end of the dryer and the load station for the enameling furnace. Motorized brushing wheels are used principally for removing excess bisque so that the cookware has a surface for the burning of the enamel without leaving a marred surface on the piece.

Immediately following brushing, the ware is loaded onto trays which form a part of the furnace installation. The trays are located on a return conveyor paralleling the furnace, which serves both as a loading conveyor for the furnace and as a cooling conveyor for the fired ware. An indexing system unloads a single line of trays from the loading conveyor and loads them in double line on the furnace conveyor.

As the finished cookware leaves the furnace it is indexed automatically to the conveyor just described, which provides for cooling, and takes the ware to an inspection belt. Included in the inspection procedure is a check for enamel thickness with an electric thickness gauge. The thickness is maintained at a maximum of ten to twelve-thousandths.

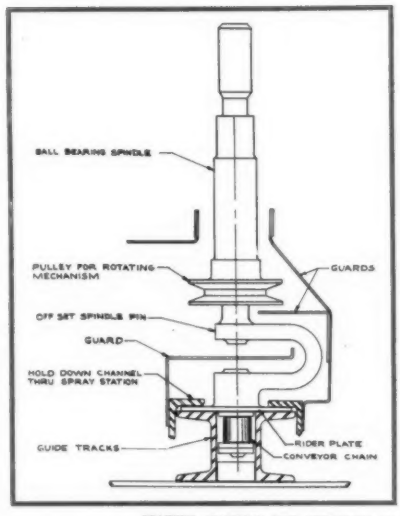
The inspection belt delivers the ware to a transfer point where it is picked up by a belt traveling at right angles, to service the packaging area.

New type automatic furnace

A completely automatic roller hearth furnace, new to the porcelain enameling industry, represents a central point of interest in the Textile Machine Works porcelain enameling department.

The new furnace has an input of 675 kw, divided into three zones of temperature control. Driven rollers, centrifugally cast of 25-20 chrome nickel analysis, carry the ware through the heating and cooling section. The furnace is equipped with charge and discharge vestibules which serve to minimize the problem of heat loss. It is designed for operation on 460 volt, 60 cycle, 3 phase AC current.

One of the unique features of this installation is the fact that it is equipped with bayonet-type heating elements mounted above and below the roller hearth. Zone one incorporates 24 bayonet heating elements, and zones two and three involve 18 heating elements each. The elements are all wired from one side of the furnace, and are designed so that they can be removed and replaced while the furnace is still under heat. The bottom elements have refractory-type supports, and the top elements are mounted on a lighter refractory support which seats on a heat-resisting alloy I-beam.



DRAWING COURTESY THE DEVILBLISS CO.

Detail of the spindle chain-on-edge unit.

The heat zone is designed for operation as a balanced three-phase load. Both charge and discharge vestibules are five feet long; the firing chamber is 43 feet long; and the cooling section is 15 feet long. All sections are six feet in width.

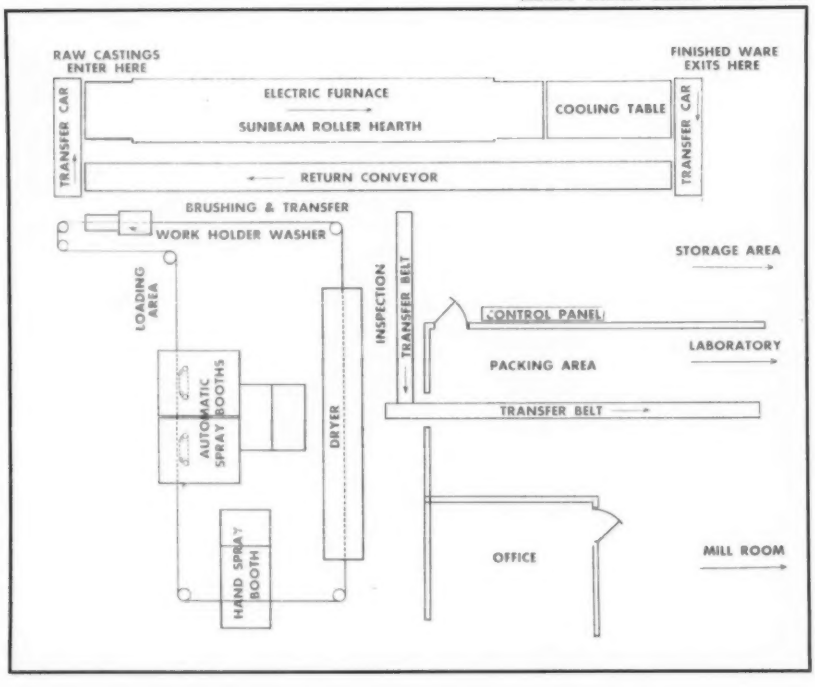
The installation includes a single tray handling conveyor, as described earlier. It is 70 feet long and 3 feet wide. The alloy trays which carry the work are 33 inches wide by 30 inches long. The trays pass through the heating and cooling sections of the furnace in pairs, but at the discharge end are indexed for single line travel on the return conveyor.

The furnace and return conveyor have three main 3/4-hp drives, each consisting of a variable speed transmission, speed reducers, and drive motors. In addition, there are four speed-up drives, each including 1/3-hp motors, to move the trays on and off the transfer. All of the drives have shear pin hub assemblies to provide for safety in the event of jamming or excessive overloads. The three main drives on the furnace and cooling section incorporate clutch units which permit moving the trays out of the heat zone in the event of power shutdown. This is accomplished by turning a large hand wheel.

The furnace proper incorporates temperature controls to provide for automatic shutdown in the event of failure of temperature control instruments or abnormal electrical conditions. Positioning of the trays throughout the heating and cooling operation is accomplished by limit switch actuators which trigger

FLOW DIAGRAM OF THE PORCELAIN ENAMELING LINE

DRAWING COURTESY CHICAGO VITREOUS CORP.



limit switches mounted on the outside of the furnace. This system provides for the necessary speedup in roll drives between vestibule sections, high heat sections, cooling section, and discharge conveyor.

There is no manual operation with respect to any part of the tray travel through either the furnace equipment or on the return conveyor. A total of 74 work-carrying trays are involved in the operation. The trays are fabricated from type 309 stainless alloy.

The furnace equipment has a maximum capacity of 5500 pieces of ware for a two-shift operation, based on an average loading of one piece per square foot of loading area, and an average unit weight of approximately 3½ pounds. This takes into consideration a cycle time through the firing section of the furnace of 20 minutes.

Heat recording and control

A central control panel and power panel includes all of the necessary temperature control equipment, indicating lights, pushbutton stations, etc., involved in the operation. The motor control panel includes all contactors, starters and relays used in automatic sequencing of the furnace and return conveyor.

Three zones of temperature control are provided in the furnace. Each of the three zones is controlled by a two-position indicating and controlling potentiometer, complete with thermocouple and independent single pole, double throw switch. The independent switch on each instrument is utilized as an excess temperature switch to sound an audible alarm included in the control panel. In addition to this excess temperature control feature, at a point adjacent to the electric heating elements, an over-riding type of excess temperature control is provided to prevent possible destructive temperatures on the heating elements by virtue of electrical difficulties.

To provide a continuous temperature record for each zone, a three-record, non-controlling, multi-point instrument is included in the panel.

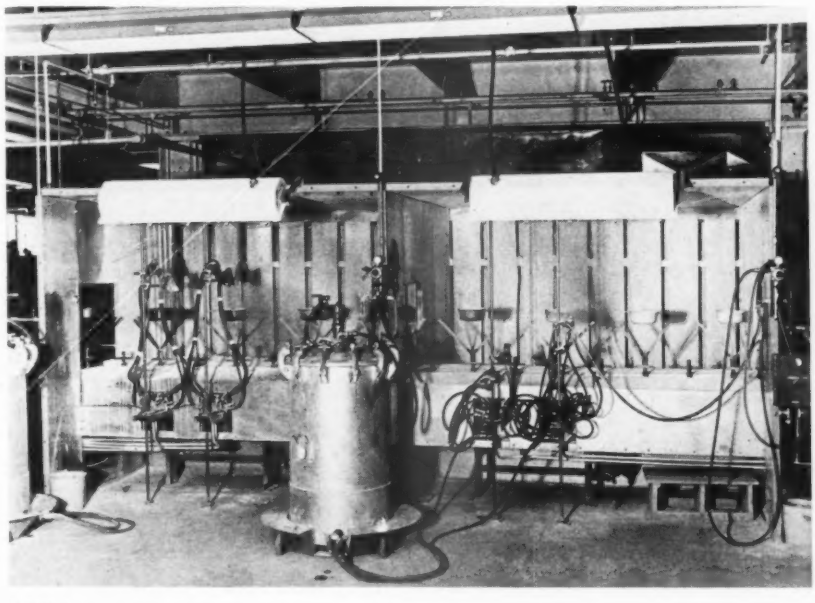
Competitive production

TMW executives report very satisfactory production from the new facility, both with respect to quality and quantity. It is expected that this highly mechanized, compact, enameling plant will enable Prizer-Ware to compete very favorably with imports and continue to build business in the cast iron cookware field for this American facility. So great is the belief in the strength and durability of the porcelain enameled cast iron ware that a manufacturer's guarantee has been established against chipping, cracking, or staining under normal use.

Prizer-Ware comes in three popular colors to blend or contrast with modern kitchen decor. Representative pieces shown here: a saucepan in lustre red; a white divan dish, decorated with an ivy motif; a turquoise skillet; and a red Dutch oven.

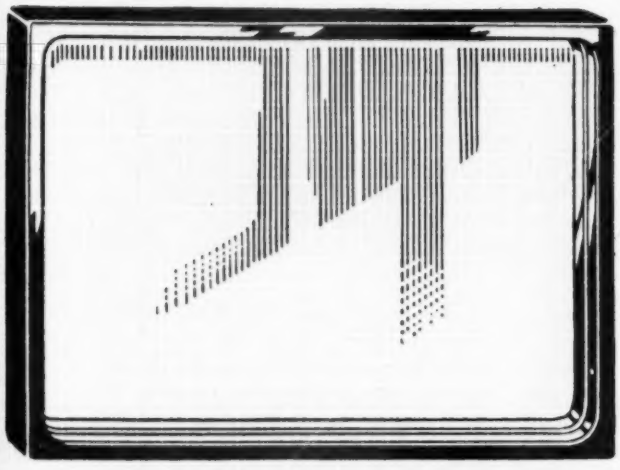
MPM *editors appreciate the cooperation of the following people in the preparation of this article: John P. Zur, Sunbeam Equipment Corp.; John Vernetti, Chicago Vitreous Corp.; George Ecke, Textile Machine Works; and M. L. Pouilly, The DeVilbiss Co.*

These twin booths are equipped with stationary automatic spray guns. There are two stations in each booth, with each station mounting three guns. Interiors of the ware are coated in the left hand booth, and exteriors in the right. Colors may be varied as required.



Operator brushes off excess dry bisque with power-driven brushing wheel, after which it is transferred immediately to conveyor serving the furnace.

GAFFERS & SATTLER . . . one of the long line of satisfied PERMA-VIEW® users.



Utility Appliance Corp., manufacturers of the Gaffers & Sattler range, is one of the 85 leading range manufacturers using PERMA-VIEW oven door windows.

As a practical, economical and effective component, PERMA-VIEW can be your best sales feature. Be sure you take advantage of this sales feature in your new models — either free-standing or built-in.

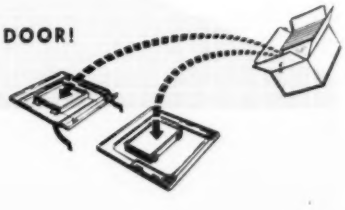
Mr. Ben B. Breslow, president, Utility Appliance Corp. states:

"We are certainly pleased with the performance of the PERMA-VIEW windows that we utilize in our Gaffers & Sattler built-in and free-standing ranges. They provide fine consumer appeal by virtue of their quality, and meet the requirements of our standards of performance and design. We congratulate Mills Products, Inc. on their continued emphasis on quality."

Phone or write us for complete details on the ease and economy of adding this sales feature to your new range.

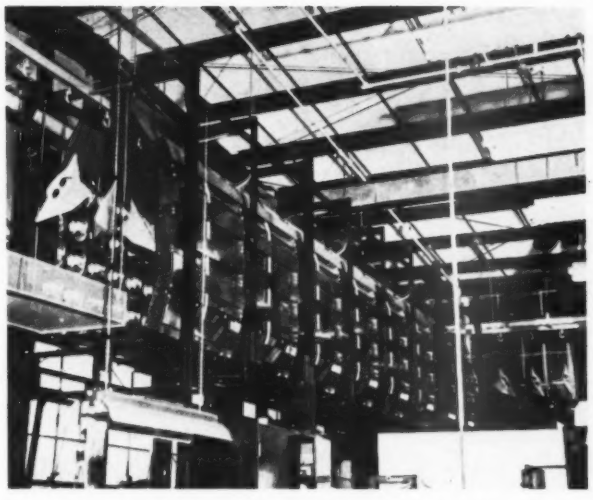
This Gaffers & Sattler Mark '20' built-in oven, which utilizes PERMA-VIEW windows, has been selected for excellence in design by the California Design Institute.

out of our CARTON . . .
into your DOOR!



MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD, WALLED LAKE, MICHIGAN • *Phone MArket 4-1591*



Parts emerging from new ceramic-type electric infra-red oven at Emerson Electric Mfg. Co. Installation of the system has resulted in a better bond and finish.

PHOTO COURTESY DAY CLIME LAMP CORP.

Paint production boosted 100 per cent with ceramic-type infra-red oven

A 100-PERCENT INCREASE IN PAINTING PRODUCTION on many parts with the same personnel has resulted from installation of a ceramic-type electric infra-red oven at the Emerson Electric Mfg. Co., East St. Louis, Ill., according to Don Malter, process control supervisor.

Emerson manufactures a variety of parts used by the Air Force, Ordnance Dept. of the Army, and the Marine Corps. After the application of zinc chromate and epoxy finishes, these parts, of many sizes and shapes, formerly were racked and baked in an electric batch oven 20 to 30 minutes.

The new 28-foot conveyorized infra-red oven is ceiling supported to conserve floor space. The parts, regardless of size or shape, are dried as quickly as two and one-half minutes. In addition, the new drying system has resulted in a better finish and a better bond, according to Malter, thereby enabling the plant to meet the latest military specifications on paint finishing requirements with a minimum of rejects.

The oven has positive temperature control in each of two zones. By turning a knob on a cyclical timer, temperature can be brought to any point from 0 to 100 per cent of rated power and held to less than one degree of variation.

Maintenance costs for the oven have been negligible, Malter stated, because the driQuik lava coated ceramic infra-red generators have a life expectancy of many years. There are no bulbs, quartz tubes, or sockets to burn out or need replacement in the oven.

Engineering details of the new Servel ice maker

"packaged" ice harvesting unit easy to install, service

AN MPM DESIGN FEATURE

THE FOLLOWING DETAILS cover the cycle of operation and a description of the principal component parts of the automatic ice-making mechanism. In addition, schematic diagrams are included to show the electrical switching sequences for a complete ice-making cycle.

Cycle of operation

The cycle starts with the ice mold filled with water and the storage basket empty. When the water is completely frozen, the thermostat closes to its cold position, energizing the heater and the motor. The ejector blade begins to rotate and continues for approximately 180°, at which point its blades come in contact with the frozen ice. Since it cannot move the frozen ice pieces, it causes the motor to stall. The stall period continues until the heater has caused the ice pieces to loosen from the mold, and then the ejector blade continues its rotation.

During the second 180° of rotation, the ejector blade sweeps the semi-circular ice pieces from the mold. During the last 60° of this rotation, the water valve is energized, so that fresh water fills the mold. The cycle ends when the ejector blade reaches its starting position, the ice pieces just removed from the mold resting on the ejector blade, and the mold filled with fresh water. All electrical circuits are de-energized.

The ice pieces now resting on top of the ejector blade remain there while the next batch of ice is frozen. During this period, the outer surface of the ice pieces are refrozen, since the ambient temperature is well below 32° F. Thus, when the next cycle starts, the rotation of the ejector blade causes these ice pieces to fall into the storage basket and, because they have been completely refrozen, they may be stored for a long period of time without sticking together.

The ice-making cycles continue until the storage pan is full, at which time the stop arm resting on the accumulated ice is held above a pre-determined position, and the electrical switch controlled by it is kept open. This prevents further operation of the ice-making mechanism until the user has removed sufficient ice pieces to permit the stop arm to drop below a pre-determined position. Further details of the operation will become apparent from a study of the description of component parts, and the schematic electrical diagrams.

Description of parts

Ice mold — An aluminum die casting having a semicircular interior divided into seven compartments by partitions. Since water enters at one end of the mold, each partition has an opening to permit free flow to all compartments. The bottom of the mold is flat to allow secure attachment to a supporting shelf.

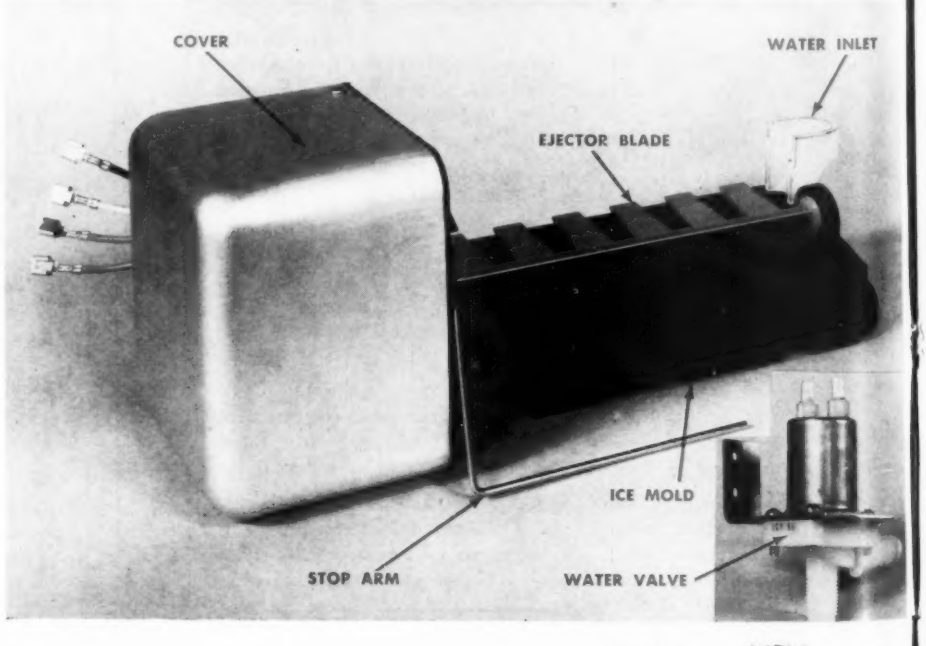
Heater — A ceramic-embedded, aluminum-sheathed line voltage resistance heater. It is embedded in a groove on the underside of the mold in thermal contact with the mold. Its purpose is to warm the mold sufficiently to free the ice pieces so that they may be removed from the mold.

Water inlet — A molded nylon chute attached to the end of the ice mold into which the water tube is inserted. It is designed to locate the end of the water tube at least one inch above the water level in the ice mold in order to meet the anti-siphon requirements of plumbing codes.

Ejector blade — An aluminum extrusion machined so that seven blades extend

(Lift Page)

The complete assembled ice maker, ready for installation in a domestic refrigerator. The solenoid-operated water control valve is shown at lower right, and has a built-in constant flow device for regulating quantity of water to the ice maker.



from a central shaft, each blade aligned to sweep one compartment of the ice mold. The shaft turns in nylon bearings at the front and rear of the mold. The ejector blade is designed to retain on its top the last set of ice pieces removed from the mold so that they may freeze dry before the next cycle drops them into the storage receptacle.

Cover — Anodized aluminum—1/16-inch thick.

Stop arm — A polished stainless steel arm that is cam-driven to a "high" position during each ejection cycle and then released. When the ice storage receptacle is full, the arm in its released position is suspended by the accumulated ice, preventing further operation of the mechanism until sufficient ice has been removed to permit the stop arm to fall to its "low" position.

Geared motor—A two-pole shaded-pole motor driving a reducing gear train. The output shaft which turns at approximately one rpm is connected to the ejector blade at one end. The controlling cams are mounted on the opposite end.

Combination switch — A bank of leaf switches assembled in tandem which performs four separate switching functions, depending upon the position of the controlling cam and upon the position of the stop arm. See "Sequence of Operation."

Cams — Three nylon cams are attached to the output shaft of the geared motor. One cam drives the stop arm to a high position and releases it during each cycle; another drives the combination switch through its series of functions; and the third is adjusted to extend the period of time that the water valve is energized to deliver the exact amount of water required to fill the mold.

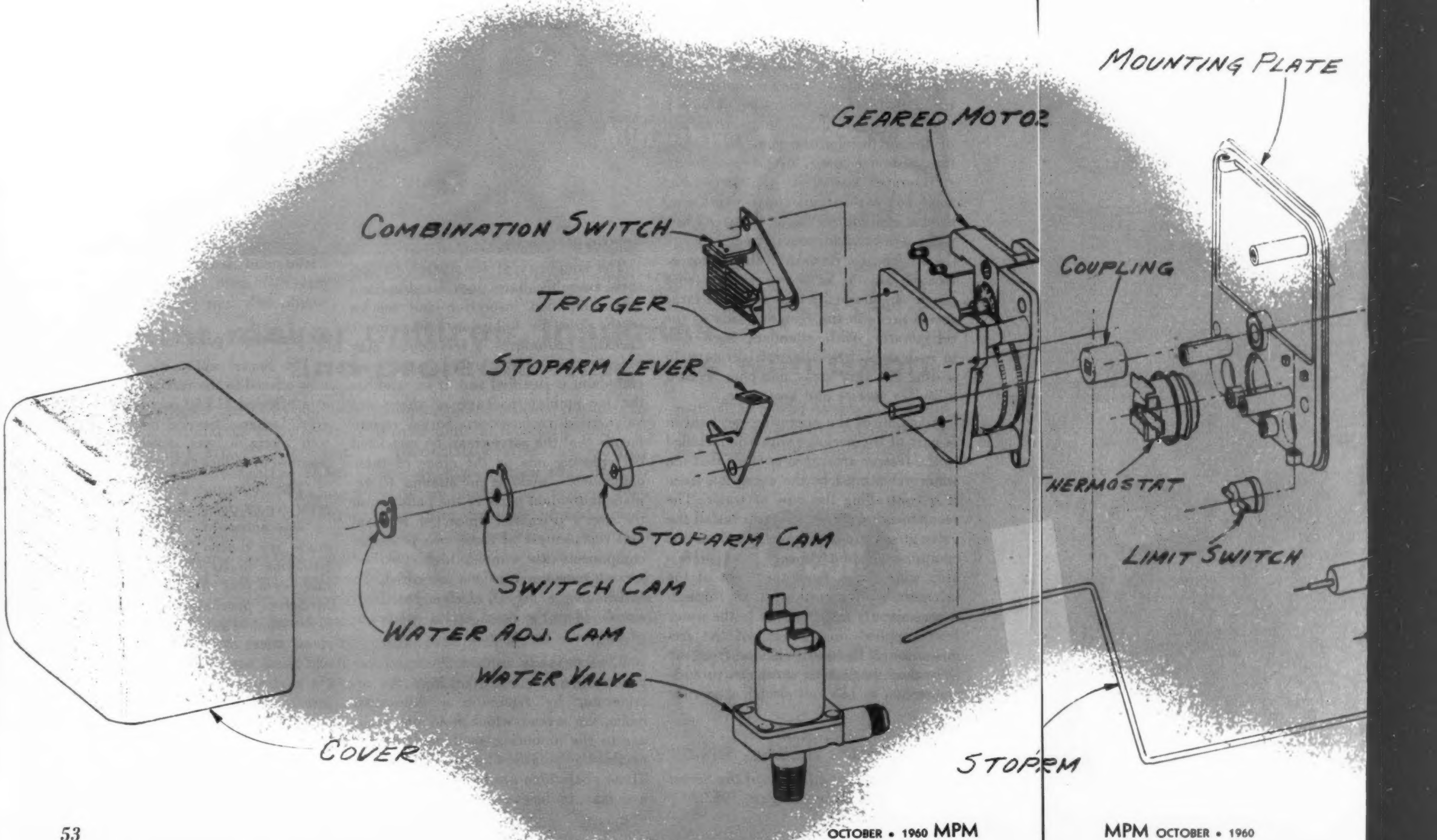
Trigger — A nylon piece suspended in such a manner that, unless tilted away by the stop arm in its low position, it engages the top blade of the combination switch, and holds the stop arm switch open.

Thermostat — A single-pole double-throw switch actuated by a bimetallic disc in good thermal contact with the end of the mold.

Limit switch — A bimetallic, automatic reset switch adjusted to open at 135°. This safety device de-energizes all electrical components in the event that some obstruction or malfunction causes the heater to remain energized for an abnormal period of time.

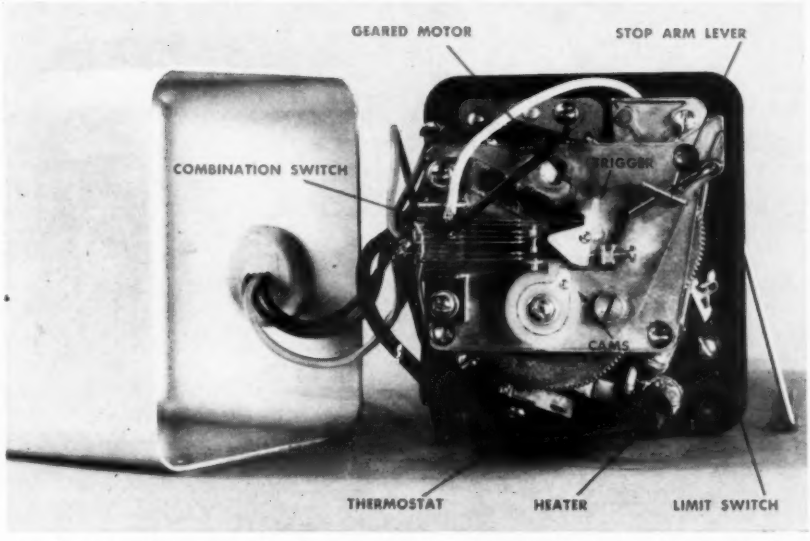
Water valve — A solenoid ... whic[h] in the energized position ... wat[er] to the ice mold. It features a ... flow device so that the ... passed is directly proportion[al] ... under all normal supply pr[es]sure above 20 pounds. It also conta[ins] a ... water strainer. The wat[er] valve is installed in any convenient [lo]cation outside the freezing area of t[he] appliance.

After the appliance is installed a[nd] cooled to normal operating temper[a]tures, the automatic ice maker will b[e]gin repeated cycles, producing sev[en] semicircular ice pieces each cycle un[til] the storage receptacle is full. The op[er]ating sequence of one ejection cycle [is] illustrated by the schematic wiring di[a]gram and by pictorial diagrams whi[ch] show the switch positions with relati[on] to the motor-driven cam. *to Page 56*

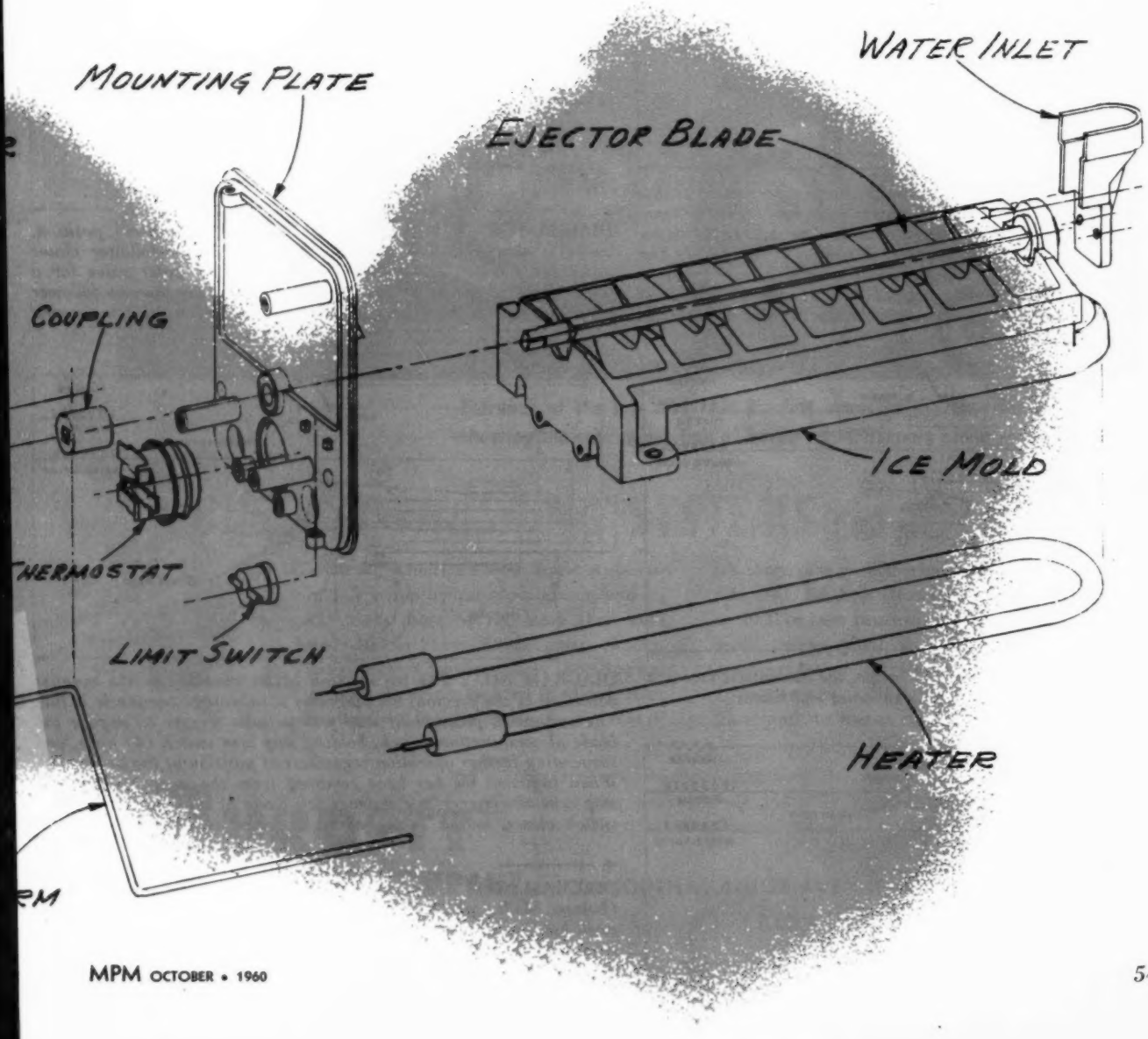


Water valve — A solenoid valve which, in the energized position, passes water to the ice mold. It features a built-in constant flow device so that the quantity of water passed is directly proportional to time under all normal supply pressures above 20 pounds. It also contains a built-in water strainer. The water valve is installed in any convenient location outside the freezing area of the appliance.

After the appliance is installed and cooled to normal operating temperatures, the automatic ice maker will begin repeated cycles, producing seven semicircular ice pieces each cycle until the storage receptacle is full. The operating sequence of one ejection cycle is illustrated by the schematic wiring diagram and by pictorial diagrams which show the switch positions with relation to the motor-driven cam. *to Page 56* →



Anodized aluminum cover has been removed to show details of operating mechanism.



SEQUENCE OF OPERATION

schematic diagrams showing electrical switching sequences

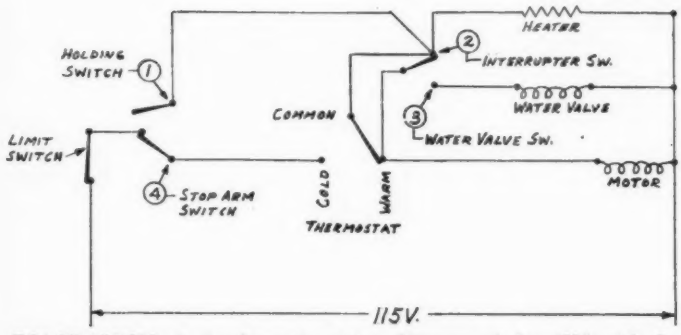


DIAGRAM NO. 1 *A schematic wiring diagram of the AIM with the various switches identified and numbered in accordance with the pictorial diagrams to follow. It assumes that the ice storage receptacle is empty and the mold filled with water in the process of freezing.*

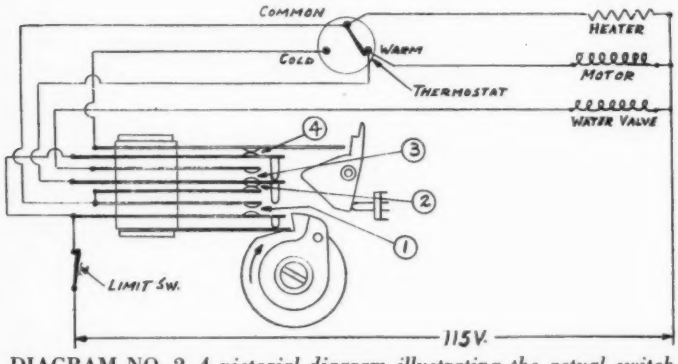


DIAGRAM NO. 2 *A pictorial diagram illustrating the actual switch and cam arrangement with the AIM under the same operating condition as shown in No. 1. The thermostat is "warm." The holding switch (#1) is open. The interrupter switch (#2) is closed. The water valve switch (#3) is open. The stop arm switch (#4) is closed. All circuits are de-energized. The ice storage receptacle is empty and the mold is filled with water in the process of freezing.*

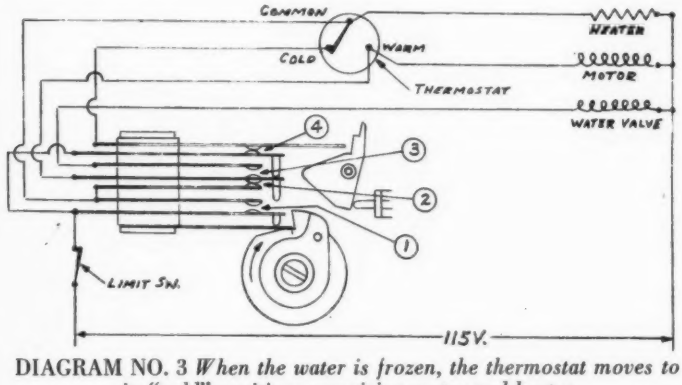


DIAGRAM NO. 3 *When the water is frozen, the thermostat moves to its "cold" position, energizing motor and heater.*

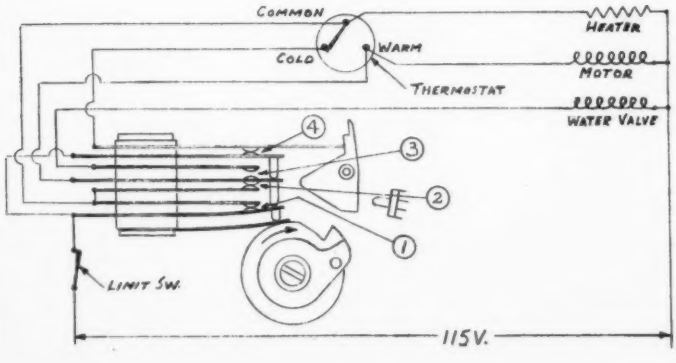


DIAGRAM NO. 4 *As the motor-driven cam rotates, the cam-follower (bottom blade) of the combination switch is raised sufficiently to close holding switch (1), assuring completion of the ejection cycle even though thermostat immediately resets to its "warm" position. This switch position is maintained while ejector blade rotates to a position against the ice, stalling the motor until the heater has warmed the mold sufficiently to free the ice pieces and permit the ejector blade to continue its rotation, sweeping the ice pieces before it.*

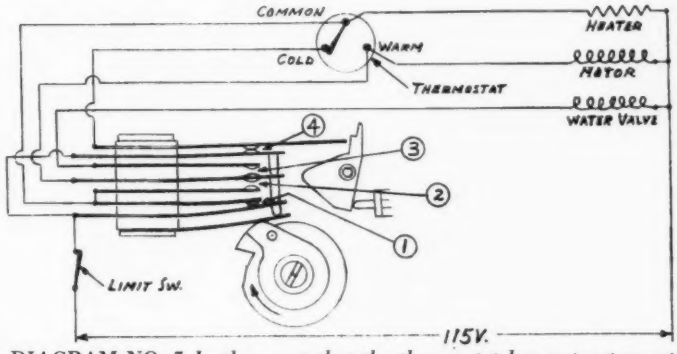


DIAGRAM NO. 5 *In the event that the thermostat has not yet re-set to its "warm" position, the motor is de-energized as interrupter switch (2) opens. The motor remains stopped until thermostat re-sets. Since the heater continues energized, should the thermostat fail to reset, system will cycle on the limit switch until serviced. This feature eliminates possibility of flooding due to repeated cycles.*

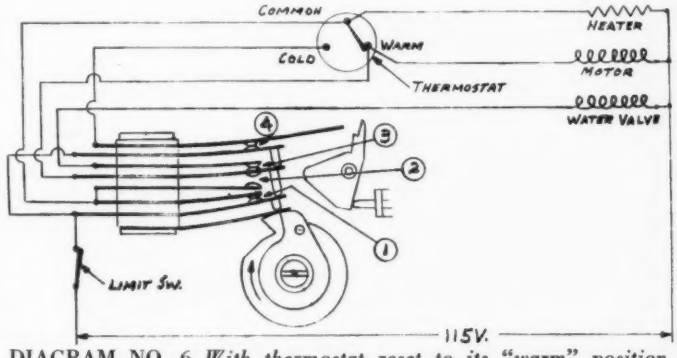


DIAGRAM NO. 6 *With thermostat reset to its "warm" position, motor is energized. The continued rise of the cam-follower closes water valve switch (3) to energize the solenoid water valve for a pre-determined period of time. The cycle ends when the cam-follower drops off high point of cam de-energizing all electrical components.* (See Diagram 2)

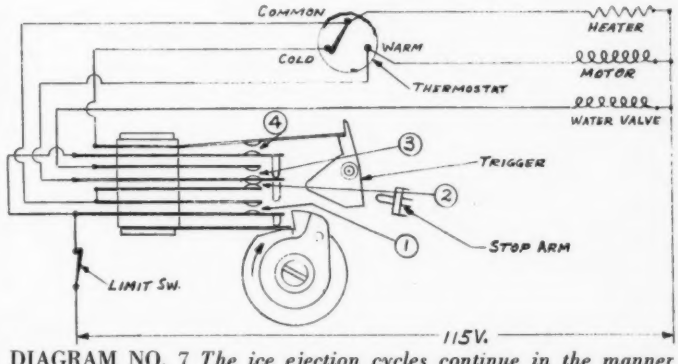
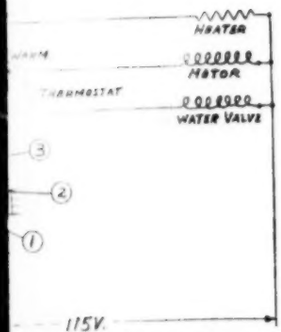
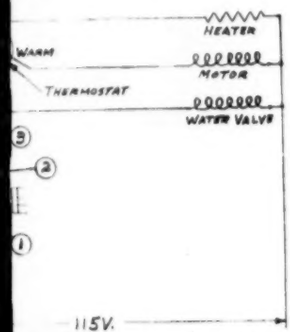


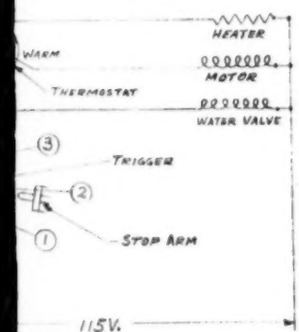
DIAGRAM NO. 7 *The ice ejection cycles continue in the manner described in the previous six diagrams until storage receptacle is full. The suspended position of stop arm permits trigger to engage top blade of combination switch, holding stop arm switch (4) open, and suspending further operation regardless of position of the thermostat. When sufficient ice has been removed from the storage receptacle, stop arm tilts trigger to disengage top blade of stop arm switch (4), switch closes, and a cycle begins, provided thermostat is "cold."*



e thermostat has not yet re-set
s de-energized as interrupter
topped until thermostat re-sets.
should the thermostat fail to
tch until serviced. This feature
g due to repeated cycles.



reset to its "warm" position,
ise of the cam-follower closes
he solenoid water valve for a
cle ends when the cam-follower
izing all electrical components.
m 2)



ycles continue in the manner
until storage receptacle is full.
permits trigger to engage top
stop arm switch (4) open, and
s of position of the thermostat.
d from the storage receptacle,
blade of stop arm switch (4),
rovided thermostat is "cold."

n cam rotates, the cam-follower
switch is raised sufficiently to
mpletion of the ejection cycle
resets to its "warm" position.
hile ejector blade rotates to a
e motor until the heater has
the ice pieces and permit the
sweeping the ice pieces before it.

A STATEMENT TO MPM EDITORS BY DUNCAN C. MENZIES, PRESIDENT, SERVEL, INC.

"MY GRANDMOTHER, WITH THE AID OF AN ICE PICK, FOUND IT EASIER TO GET A CHUNK OF ICE THAN DO TENS OF MILLIONS OF HOMEMAKERS TODAY WHO LOOK FOR LABOR-SAVING CONVENIENCES IN MODERN APPLIANCES."

The current Servel automatic ice maker is a re-engineered and improved version of the device described in the August, 1957 issue of MPM.* While the new unit retains the basic operating features which proved successful in the homes of some 200,000 users, research and development during the past few years have resulted in marked improvements in the areas of application, service and initial cost, with no sacrifice in quality, performance or anticipated life.

Simplified application

The concept of "front-mounting" has, perhaps, contributed the most to recent developments. By "front-mounting" we mean that the ice harvesting device is adapted for installation in a refrigerator or freezer through the same door which the customer uses for access to the refrigerated space. A non-refrigerated shelf for mounting the ice-making mechanism and access to electricity and water are all that is required to adapt the device to a domestic refrigerator or freezer. This is in sharp contrast with previous concepts, which required large access areas in the rear and side of the refrigerator, with attendant high cost in re-design of existing refrigerators, in sealing the entry areas, and poor accessibility for service and inspection.

Since all of the operating mechanism is part of the package which is installed in the freezer area, it is obvious that the water valve must be the exception since it is controlling the flow of water. The recommended procedure is to install the valve at some remote point (such as the compressor compartment), and preferably with access from the front of the refrigerator. Water then flows through a permanently installed line to the water inlet supplied on the end of the ice-maker mold. Four wires extend from the ice-maker mechanism cover to provide connection to 115 volt electrical service.

(See "Engineering Details of the Servel Automatic Ice Maker, August, 1957.)

Service provisions

The simplicity of installation on factory assembly lines goes hand-in-hand with simplified inspection and service in the field. By following a few simple checking procedures, a serviceman may quickly determine whether a customer complaint is justified and, if so, whether the ice making package or the water valve need replacement. Servel recommends that the serviceman be restricted to replacing one or the other of these components, making no attempt to replace individual parts of the package on the user's premises. Since the removal and replacement of these two principal components are simple, highly skilled service personnel is not required. In addition, the overall design has been simplified to the point that a minimum of service is anticipated.

When properly applied, the ice-maker package may be removed from the refrigerator by removing a decorative baffle, the screws which hold the package to the mounting shelf, and disconnecting a polarized electrical plug. These operations are so simple that the user may, in the event of out-of-warranty failure, make a low cost exchange at his dealer and install a replacement ice maker himself. The entire package weighs only four pounds.

A "package" price

The Servel automatic ice maker is now offered to the refrigeration industry at a price of $13.50 each, F.O.B. Evansville, Indiana. Several projects, already well along in the development stage, promise to reduce this price still further.

(The following is quoted from the MPM *report dated August, 1957:*

"One noteworthy fact about the automatic ice maker has been the steady reduction in its cost. During the first two years that this feature was offered to Servel purchasers, it represented a differential of $70 between the suggested retail prices of models equipped with it and those not equipped with it. During the past two years this retail price differential has been cut to $50. There is every reason to believe that, with continued engineering improvements and increased volume production, the factory cost of the unit can be brought to as little as $15.")

Another new development using

B.F.Goodrich Chemical *raw materials*

Watthour and demand meters made by Duncan Electric Co., Inc., Lafayette, Indiana, use a casing of Geon vinyl for current-electromagnet assembly injection-molded in place. B.F.Goodrich Chemical Company supplies the Geon vinyl.

Meter maker unitizes, insulates, and protects magnets with Geon

Geon vinyl does a three-way job for this meter manufacturer. By securing parts in position, providing insulation and protecting them against injury, Geon helps produce a better, longer lasting current-electromagnet assembly.

The manufacturer says that Geon exhibits excellent heat stabilization –it holds up well under high temperatures without exuding fumes that might corrode brass parts used in other areas of the meter. In addition, use of Geon made possible a less critical molding process, resulting in a more uniform finished piece.

Immediately after the molding process, high voltage tests of 7500 volts are made from turn to turn and from turn to ground—proof again of the outstanding electrical properties of Geon vinyl.

Here's another example of the way that products can be improved with Geon. Why many manufacturers are using it to open whole new markets. To get more information, write Dept. GD-6, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon VINYLS

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

The CHRYSLER Finish *has to be good...*

Entrance of the two 900 foot Burdett ovens in the Chrysler Plant, showing the continuous line of Burdett 10-L Burners along each side.

BURDETT FINISHING SYSTEMS do the JOB!

Chrysler ("America's Best Built Automobile") is a quality car throughout, and its good looks must be far more than skin deep. Its brilliant finish must *endure*. That's why Chrysler uses the Burdett Finishing System. Burdett Radiant Heat actually "welds" the finish to the metal; it's there to stay, and what's more the Burdett 10-L Radiant Heat Burners save 30% to 70% in heat processing costs, compared with conventional methods. Operation temperature at refractory maintained at approximately 2300 F. with only a radiant glow and no flames discernible.

BURDETT

Whether you need a complete finishing system, an addition to your present layout or the renovating of your old system, Burdett engineers can help you. Write today.

MANUFACTURING COMPANY · 4920 SOUTH MONITOR AVENUE CHICAGO 38, ILLINOIS

COMPLETE FINISHING SYSTEMS FEATURING RADIANT HEAT COMBUSTION

What causes appliance motors to fail?

by Leo Kowal • SERVICE INDUSTRY SPECIALIST, METALS & CONTROLS DIV., TEXAS INSTRUMENTS, INC.

result of two-month study shows motor-winding burnout a leading cause

ALTHOUGH APPLIANCE MOTORS are designed and built to give years of trouble-free performance, abnormal conditions can and do arise which cause the motors to overheat and burn out. Most appliance motors today have protection of some type. However, not all types of overload protection approved by Underwriters Laboratories are equal in effectiveness.

Common causes of overheating are continuous overloads, frequently repeated overloads, low line voltage, too frequent starting and stopping, jamming of the drive mechanism, excessive ambient temperature, failure of ventilation, or mechanical failure.

Early in 1960, this writer spent two months in New York City studying the causes of appliance motor failures. The accompanying tabulation resulted from working closely with the appliance sales dealers, appliance servicing dealers, and the service stations that actually serviced the appliances' electric motors. Every motor was scrutinized closely to determine exactly what caused it to fail.

The purpose of this program was primarily to evaluate the motor overload device used in or for the motor to prevent winding burnouts. The chart is self-explanatory in regard to the type of failures that took place. Some motors had multiple failures; therefore, if all figures were added together, they would be higher than the indicated totals.

The writer would like to call attention to the very dangerous motor-winding burnout columns. It is true that these columns represent only a percentage of the total number of motor failures, but every category should be studied closely to see what causes can be reduced. Any reduction in motor failure means that the chances for customer dissatisfaction with the appliance in general are lessened.

The difference between the two categories (remote and inherent) for motor-winding burnouts may generate some questions.

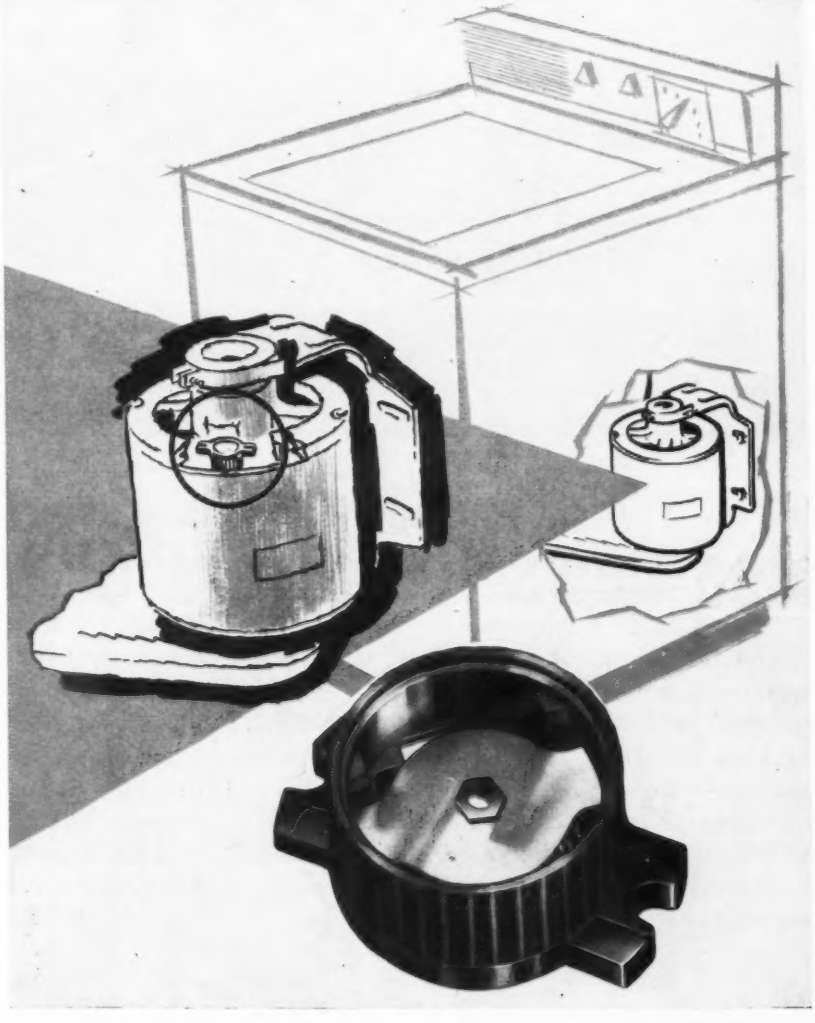
Remote overload relays respond to motor current only. They are designed to reflect, in some measure, the heating generated in the windings of a motor by load current. But current is only one of the factors contributing to motor temperature. Different ambient temperatures at the relay location and the motor location, different conditions of ventilation, and other factors may cause the motor to overheat without affecting the load current. The remote overload relay, then, does not sense the temperature of the motor, and cannot control it within satisfactory limits over the full range of operation conditions.

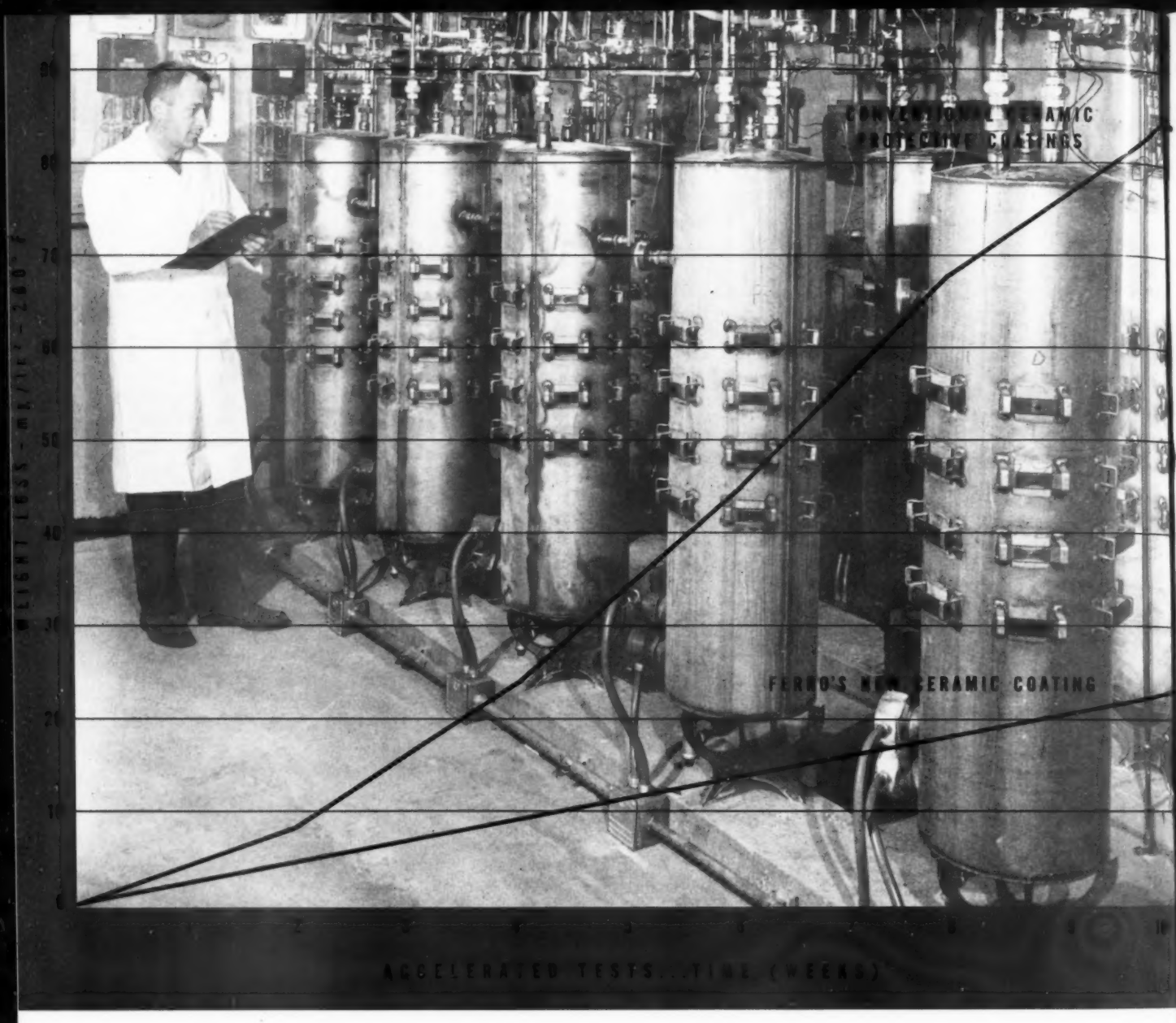
Inherent overheat protectors are small devices built into an electric motor to turn off the power when the windings get too hot. They respond to both temperature and current. The built-in protector is mounted inside the motor where it is "aware" of motor temperature at all times. It has both circuit-breaking action *and* thermostatic action. When the protector is properly applied, the motor winding temperature will reach its maximum safe limit and the protector will reach its opening temperature simultaneously; the protector will then interrupt the motor circuit.

to Page 63 →

turn to page 61 for "repaired motors field survey"

Typical application of inherent overheat protector on an automatic washer motor.





and manufacturers

Good news for buyers of water heaters

Still *longer service life*, often far exceeding present warranties, can now be built into water heaters. While good news to buyers and users, this can be even more important to *manufacturers* of such equipment—because even minor improvements in quality mean dollars in customer satisfaction.

As will be seen from the graph above, Ferro's new ceramic coatings for water heaters mark a long step forward in corrosion resistance. Based on accelerated "life" tests, Ferro's new glass coatings are vastly superior in resistance to corrosion by hot water.

Two *completely new* porcelain enamel frits have been developed by Ferro in working out the "answer" to product quality improvement. If *you* wish to improve *your* product, let us show you what we have been doing. Contact your Ferro Sales-Service Representative or write us direct.

FERRO

FERRO CORPORATION

4150 East 56th Street • Cleveland 5, Ohio
Nashville 11, Tenn. • Los Angeles 22, Calif.

REPAIRED MOTORS FIELD SURVEY #10

CITY New York STATE N. Y. SEASON Winter - 1960

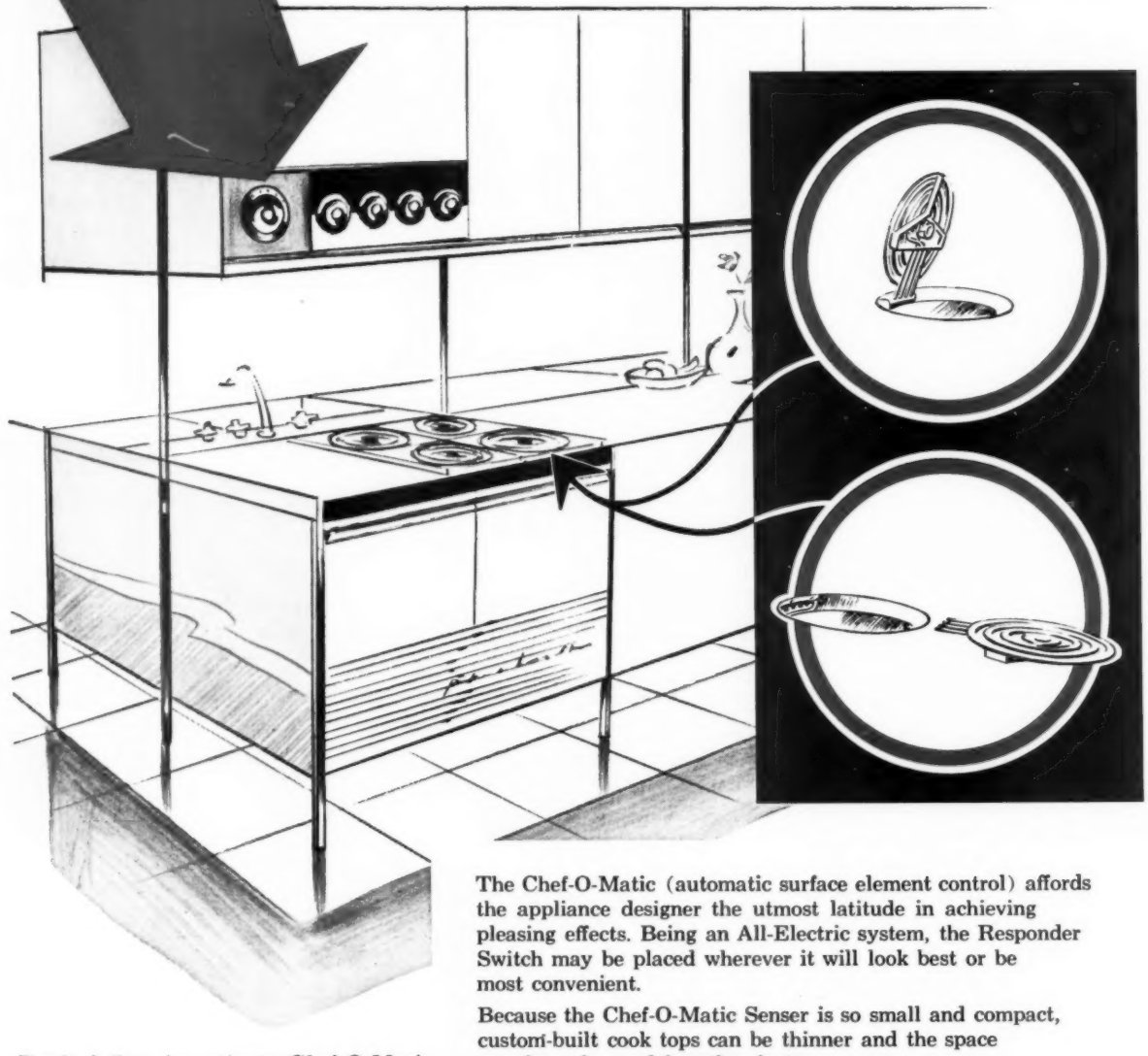
Washer - Automatic	Number of Motors	Repair Classification Based on Repair Shop Pricing: 1 Minor Only	Major: 2 Burnout	Major: 3 Other	10 OK Both Checks	11 Heater Burned-Out	Protector: 12 Terminal Burned	13 Tampered With	14 Shorted Out or Removed	15 Base Cracked	16 Wrong Rating	17 Improper Connections	18 Foreign Matter	19 Cycling Complaint	20 Other	Main Winding (Only): 21 Burned	22 Shorted	23 Grounded	24 Open	Start Winding (Only): 25 Burned	26 Shorted	27 Grounded	28 Open	All Windings: 29 Burned	30 Shorted Together	31 Open	Rotor: 32 Burned	33 Shorted	34 Open	35 Soldered	Miscellaneous: 36 Bearing	37 Start Switch, Governor, Short Circuit Device	38 Reface and/or Bore Commutator	39 Brushes, or Holder	40 Shaft	41 Capacitor	42 Connections	43 End Play	44 Leads	45 Inspection	46 Other
Total #10																																									
* Not Inherently Protected	265	110	102	53												4		43	6	73	6	1	1	25	4	3					145	183			14	15	2	2	5	1	4
% of Total		41.5	38.4	20.0												1.5		16.2	2.2	27.5	2.2	.3	.3	9.4	1.5	1.1					54.7	69.0			5.2	5.6	.7	.7	1.8	.3	1.5
Total #10																																									
** Inherently Protected	163	112	29	22	158	2												8		28	3		3	1	10						48	100			4	15	3	9	2	5	8
% of Total		68.7	17.7	13.4	96.9	1.2												4.9		17.1	1.8		1.8	.6	6.1						29.4	61.3			2.4	9.2	1.8	5.5	1.2	3.0	4.9
Grand Total #10	428	222	131	75	158	2										4		51	6	101	9	1	4	26	14	3					193	283			18	30	5	11	7	6	12
% of Total		51.8	30.6	17.5	36.9	.4										.9		11.9	1.4	23.5	2.1	.2	.9	6.0	3.2	.7					45.0	66.1			4.2	7.0	1.1	2.5	1.6	1.4	2.8
All Automatic Washers																																									
Surveys #1-#10 1951-1960																																									
* Total Not Inherently Protected	823	322	386	115												6	10	62	6	311	12	5	14	69	21	4					247	439	1	1	52	46	7	6	13	5	10
% of Total		39.1	46.9	13.9												.7	1.2	7.5	.7	37.7	1.4	.6	1.7	8.3	2.5	.4					30.0	53.3	.1	.1	6.3	5.5	.8	.7	1.5	.6	1.2
** Total Inherently Protected	240	175	30	35	235	3											1	13		29	5		5	1	17						74	142		-	8	19	3	10	4	6	9
% of Total		72.9	12.5	14.5	97.9	1.2											.4	54		12.0	2.0		2.0	.4	7.0						30.8	59.1			3.3	7.9	1.2	4.1	1.6	2.5	3.7
Grand Total #1-#10	1063	497	416	150	235	3										6	11	75	6	340	17	5	19	70	38	4					321	581	1	1	60	65	10	16	17	11	19
		46.7	39.1	14.1	22.1	.2										.5	1.0	7.0	.5	31.9	1.5	.4	1.7	6.5	3.5	.3					30.1	54.6	-	-	5.6	6.1	.9	1.5	1.5	1.0	1.7

The "Not Inherently Protected" category <u>includes</u> motors having remotely mounted circuit breaker motor protection.

Causes for motor winding burnouts in the "Inherently Protected" category were investigated and the majority of failures were due to <u>start switch</u> failures and heavy wash loads not allowing motor to get up to full speed. This condition is referred to as "running both windings in circuit." Conventional inherent protection was not designed to protect against this and similar conditions. Recently developed, however, is an inherent motor protective device which <u>does prevent</u> winding burnouts due to these and other conditions.

New CHEF-O-MATIC

ENGINEERED FOR SMART APPLIANCE DESIGN



Don't fail to investigate Chef-O-Matic for use on your new models. Write for bulletin.

The Chef-O-Matic (automatic surface element control) affords the appliance designer the utmost latitude in achieving pleasing effects. Being an All-Electric system, the Responder Switch may be placed wherever it will look best or be most convenient.

Because the Chef-O-Matic Senser is so small and compact, custom-built cook tops can be thinner and the space saved can be used for other features.

This senser can also be an integral component of the latest type "Pull-Out" surface element — easiest to clean — uses a shallow unpunched drip pan (no center hole) — less space — better heat reflection.

KS

KING-SEELEY DIVISION
OF
KING-SEELEY CORPORATION
ANN ARBOR, MICHIGAN

Appliance motors

→ *from Page 59*

The difference in the effectiveness of the two categories is very clearly shown in the chart.

During the period that the writer spent compiling data on appliance motor failures, he had the opportunity to talk with housewives who had encountered appliance motor failures. Four questions were asked:

1. Has your appliance been repaired satisfactorily?
2. How were you inconvenienced by the failure?
3. Are you satisfied with the machine?
4. Would you buy another machine of the same make?

In reply to the first question, 32 percent of those interviewed said, no, their appliance was not repaired properly. (One person reported 15 service calls in approximately eight months.)

On the second question, regarding the matter of inconvenience, 62 percent reported that dire need for the appliance's services was the biggest inconvenience. The matter of additional expense was mentioned by 29 percent of those interviewed (having to send laundry out to be washed, for example).

In reply to the third question, 35 percent of those interviewed were not satisfied with their machine after their experience with motor failure. They reported uncertainly about their machine giving them more trouble. Many felt that it still didn't "sound" right.

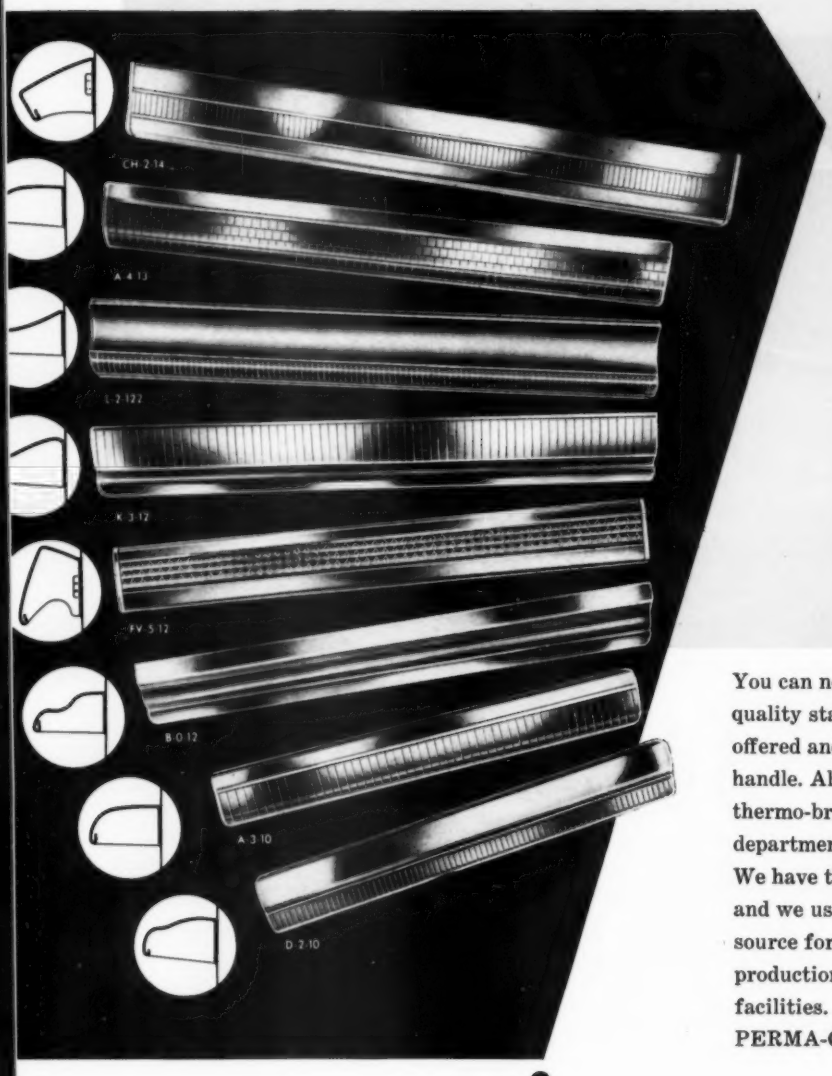
In reply to the fourth question, 47 percent of those interviewed reported that they would not, or doubted if they would, buy another appliance of the same make because of their experience with their appliance motor failure.

Also learned was the fact that 26 percent of those interviewed stated that they received "poor service."

Other typical comments were: "I think the dealer knew the appliance was defective when he sold it . . ." Another person felt that there was a "lack of communication between the appliance sales dealer and the servicing dealer . . ." Another person felt that there "should be better preventive maintenance . . ." Another person (male) when asked the fourth question, replied that he'd, "put it out in the street . . ."

This writer does not know how deep an effect the above information will have on appliance manufacturers, but the information should create much concern among those who desire to build goodwill for their product's name. If nothing

to Page 102 →

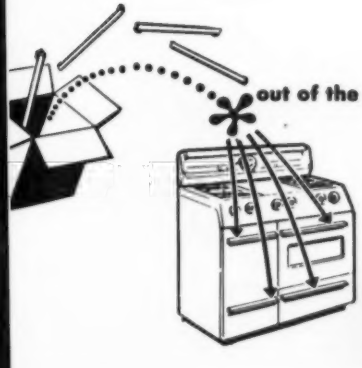


PERMA-GRIP® handles

You can now purchase your appliance handles built to Mills' quality standards. Twelve standard models are offered and six standard patterns are available on any model handle. All handles have plastic spacers which serve as a thermo-break. If you wish, consult with our engingeering department regarding special custom requirements. We have the skilled personnel, the specialized equipment, and we use the right materials to assure a reliable source for quality PERMA-GRIP handles. Let our specialized production lines serve as a part of your sub-assembly facilities. Phone or write us for complete details on PERMA-GRIP handles.

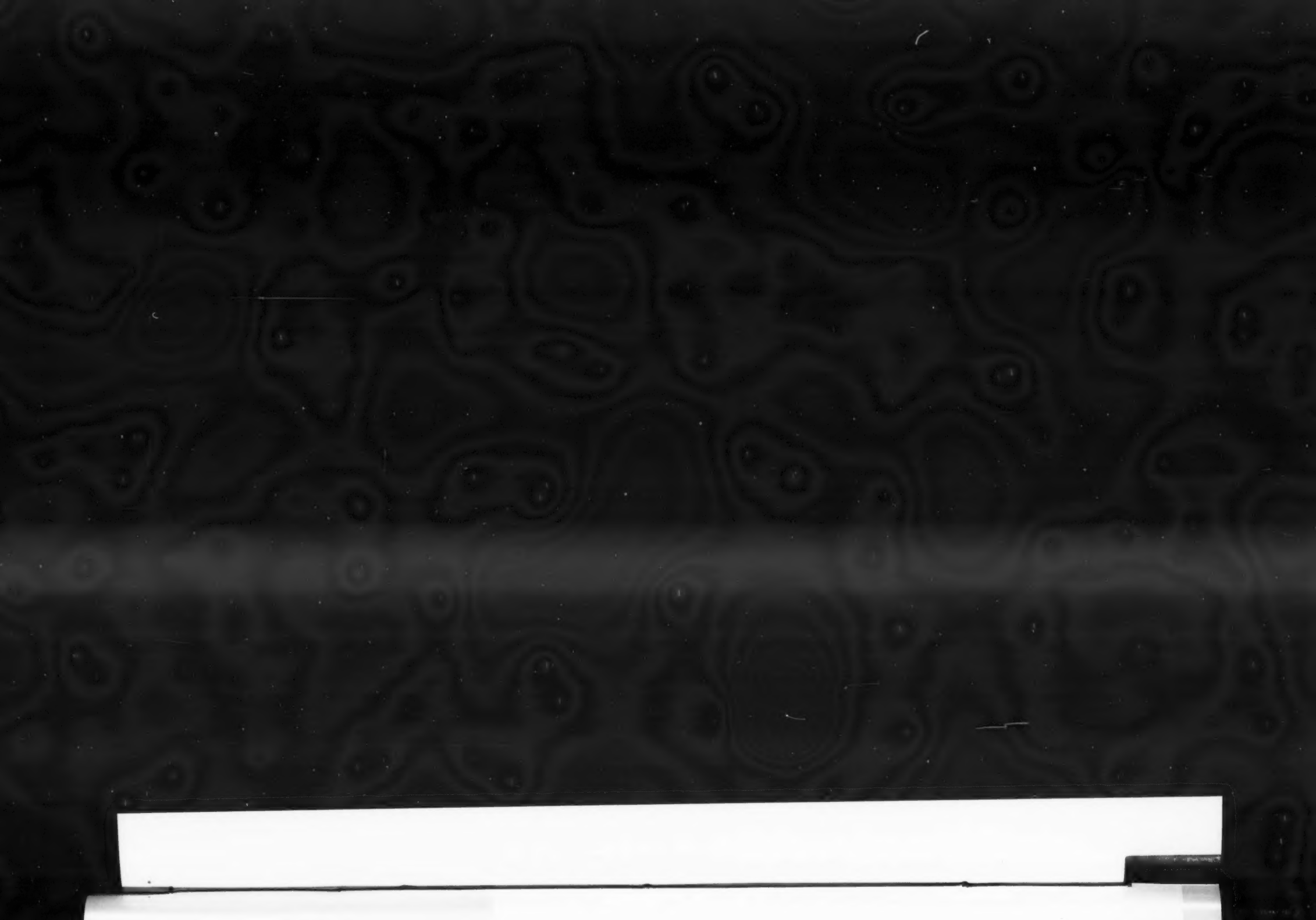
O'Keefe & Merritt

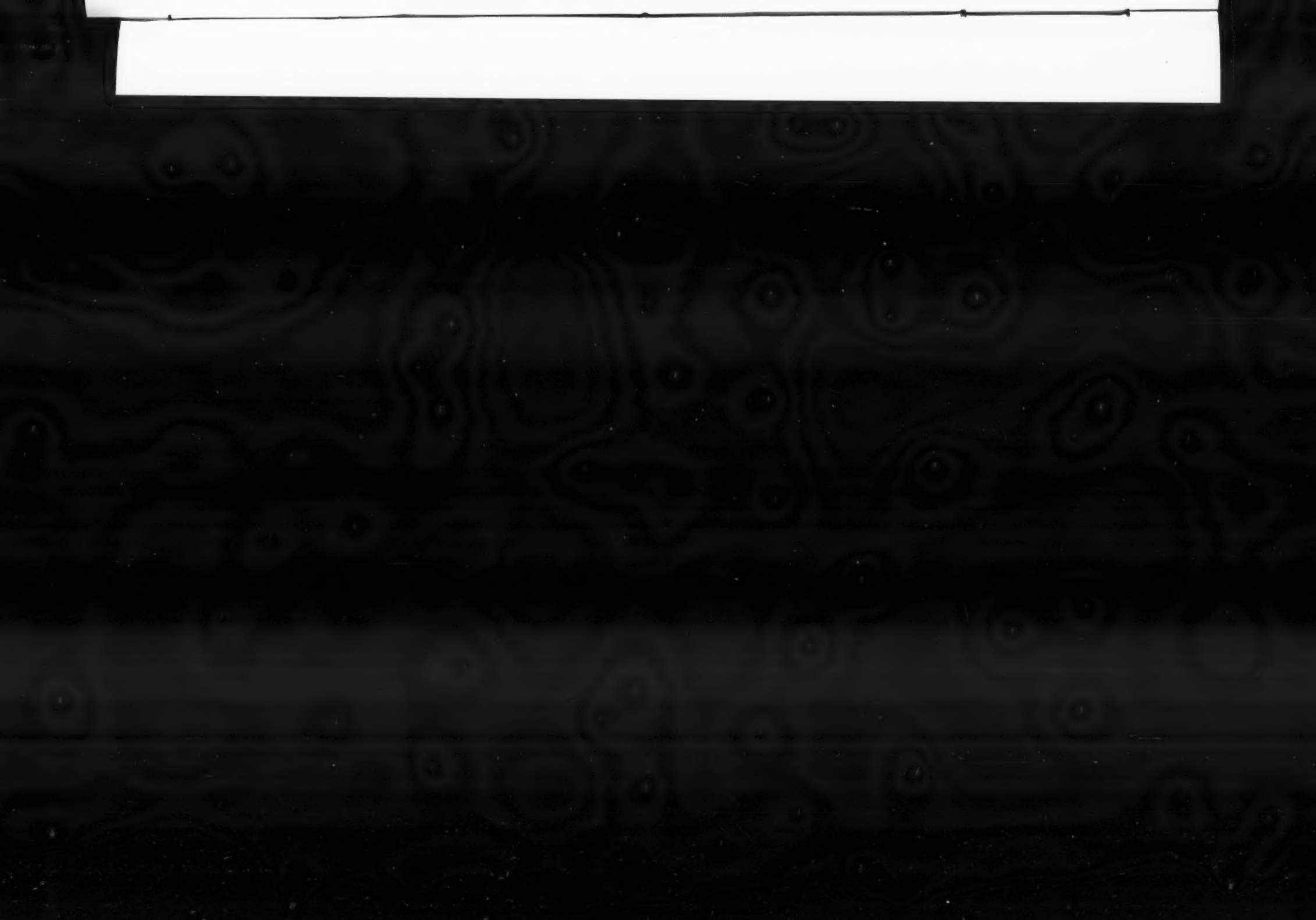
The O'Keefe & Merritt range shown at the right is equipped with PERMA-GRIP door handles. It is also equipped with the universally accepted PERMA-VIEW oven door window, another engineered product of Mills Products, Incorporated.



MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN





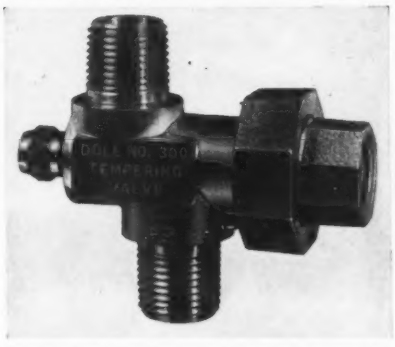
MPM

new supplies and equipment

Tempering Valve

A tempering valve which is adjustable from 120° F. to 160° F. employs a thermostatic power element to ensure positive operation.

The valve mixes hot water with cold water to produce properly controlled mixed water. The



tempered water, adequate for most uses, is safer and, when desired, 100 percent hot water can be bypassed to a washing machine or dishwasher.

Write Dept. MPM, The Dole Valve Co., 6201 Oakton St., Morton Grove, Ill.

Welding Power Sources

Two welding power sources for use with manual and automatic gas-shielded metal-arc welding equipment have been announced. The welders are capable of providing constant arc voltage output, or varying degrees of down slope. The machines are rated at 300 amperes, 100 percent duty cycle, and 500 amperes, 100 percent duty cycle.

The 300 ampere dc rectifier welder is of vertical design and provides continuous infinite down slope adjustment through a hand wheel. Adjustment may be made during welding when desired. It is recommended for welding with fine diameter wires. The 500 ampere dc rectifier welder of horizontal design can be used for welding with all diameter wires where conventional constant arc voltage or down slope is required.

Write Air Reduction Sales Co., a division of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

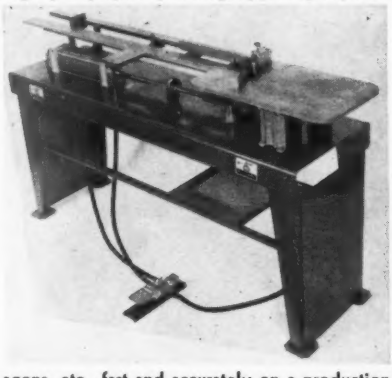
Industrial Arc Welding Machines

A line of Murex ac industrial arc welding machines in 200 to 500-ampere capacities, for heavy duty production welding, has been announced. Designated Types M20 to M50, these units are designed to NEMA standards, and provide optimum arc characteristics and stability over a wide variety of electrode types and sizes. Dual coil transformer design provides balanced wave output for a smooth, stable arc under all welding conditions. A full 75 volts open circuit is provided for instant arc starting.

For further information, contact Dept. MPM, Metal & Thermit Corp., General Offices, Rahway, N. J.

Wire, Rod and Bar Bender

A machine designed particularly for precision angle bends of wire, bar and rod has been introduced. The unit is said to form angles, triangles, U's, squares, rectangles, pentagons, hex-



agons, etc., fast and accurately on a production basis. Bending cycles averaging 500 per hour are possible. With each cycle, the material can be stacked one and one-half inches high, resulting in thousands of identical bends, depending on the gauge.

Write Dept. MPM, Lubow Machine Co., Inc., 262 Mott St., New York 12, N. Y.

Stock Molded Knobs

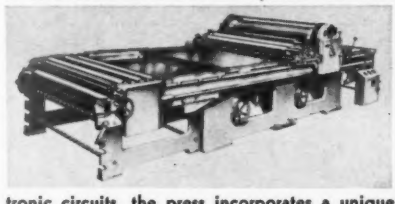
A series of stock molded knobs is available in four standard sizes, and are molded of thermosetting phenolic or urea materials. Each knob is available with nickel plated brass inserts for ¼

inch or ⅛ inch diameter shafts, with two socket setscrews. Aluminum decorative inserts or skirts may be etched and filled to customers' requirements, and are available in various anodized finishes, plain or radially spun.

Write Dept. MPM, Rogan Bros., 8025 N. Monticello Ave., Skokie, Ill.

Flatbed Offset Press

Especially designed for multi-color offset proofing, short-run color work, and the printing of acid-resists for etched nameplates and elec-



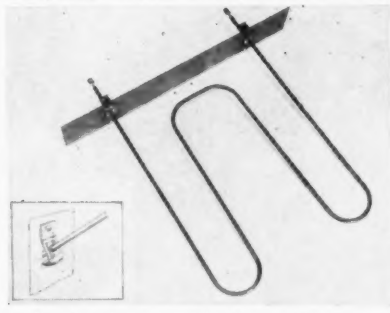
tronic circuits, the press incorporates a unique bed-suspension system which permits quality printing on a full range of paper stocks and rigid or thick surfaces.

An optional two-speed drive causes automatic slowdown when contact is made with stock, after high-speed motion through dampening and inking phases, to prevent picking on high-gloss stocks.

Write Dept. MPM, Amsterdam Continental Types & Graphic Equipment, Inc., 276 Park Avenue South, New York 10, N. Y.

Snap-Type Bake and Broil Heaters

A snap-type electric heating element that stays in an "up" position in the bake unit, or "down" in the broil unit until pressed back into place, has been announced. In normal op-



erational position, the heater makes its own tight seal against vapor and heat leakage through the oven wall.

Especially designed for oven application, these heaters have flexible spring-hinges which are easily fastened to the oven wall with self-tapping screws. The terminals extend through pre-prepared slots. No ground wires are required since the heaters, made of Inconel, are permanently grounded to the oven wall.

Write Dept. MPM, Still-Man Mfg. Corp., 429 E. 164th St., New York 56, N. Y.

Faster Extruding of Stainless Steel

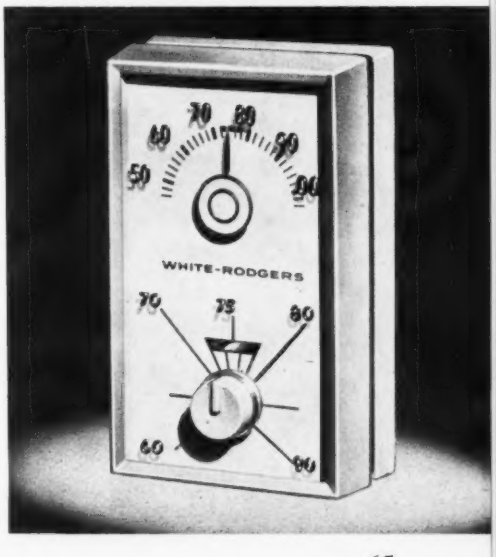
Through the use of the Ugine-Sejournet glass lubrication process, a new manufacturing technique reduces costs and substantially speeds up the production of steel and stainless steel extruded shapes. Conventional techniques involve casting large ingots and reheating and rolling them to smaller sizes. These are then recut into still smaller sizes, reheated, and rolled again.

For further information, contact Dept. MPM, The H. M. Harper Co., Morton Grove, Ill.

Heating Thermostat

The MAINline heating thermostat, Type 110-215, has knob-type thermostat setting, with a large, easy-to-read dial. Increments of 2° mark off a special 70 to 80° "comfort zone." The bimetal thermometer can be quickly recalibrated with a small screwdriver from the rear of the snap-on cover. The thermostat may be mounted directly to the wall or on an electrical outlet box.

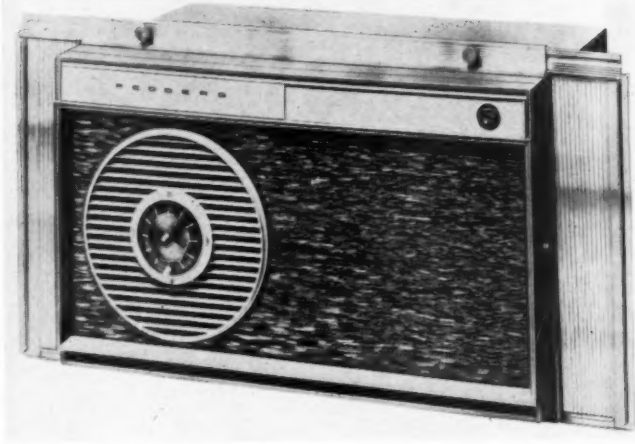
For Folder R-1691, write Dept. MPM, White-Rodgers Co., 1209 Cass Ave., St. Louis 6, Mo.



THE MPM . . . .

UNIVERSAL by *WASTE KING UNIVERSAL* gas built-in ovens and ranges now make possible a fully-integrated kitchen. Shown here are the oven, range top and undercounter dishwasher. The built-ins feature design, easy-to-use automatic roast guide, patterned glass in the oven window, and double-stippled porcelain lining bonded to the entire oven and the broiler pan.

(BELOW, RIGHT) — *STEREOPHONIC RECEIVER, MODEL 650,* by *CROSBY ELECTRONICS, INC.*, contains a super-sensitive FM tuner, an AM tuner, an advanced-circuit stereo preamplifier, and two 14-watt power amplifiers (48 watts peak). Said to be the smallest receiver on the market, the unit features pushbutton selection as well as auxiliary amplifier output jacks, mono-stereo blend, and tape monitor on the front panel.



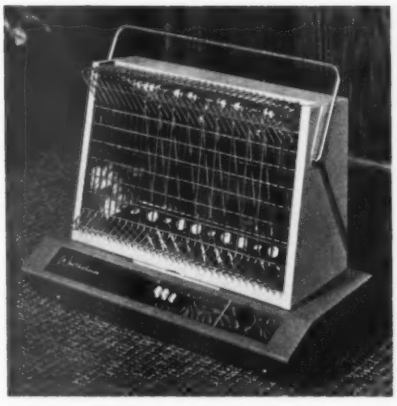
(RIGHT) — *FEDDERS CLIMATIMER* 1961 room air conditioner features a clock-timer which will automatically start the unit at a preset hour. The unit gives the user the advantage of not having to cool an empty house or come home to a hot one. Another highlight is a simplified installation that can be completed in less than 77 seconds.

REFRIGERATED DISPLAY CASE by *MCKINNEY MFG. CO.* are made almost entirely of aluminum. Believed to be the first to utilize such a high proportion of aluminum, the cases are of the closed type popular with smaller stores. The outside of the boxes are of Reynolds "Colorweld" baked enamel-painted aluminum trimmed with diamond embossed gold anodized aluminum. Perforated aluminum shelving is used on the inside trays. The perforated aluminum sheet is also used in front of the cooling coils.

(BELOW) — *"SINGLE ROOM" AIR CLEANER* by *ELECTRO-AIR CLEANER CO., INC.* is completely re-styled, has a recessed instrument panel, beaded chrome trim, and a molded plastic control knob. A grille is used over the outlet.

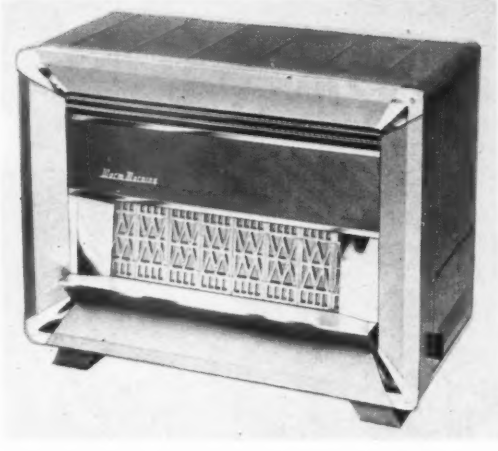
. . . . FOTO-NEWS

(RIGHT) — *COZY GLOW HEATERS* by *WESTINGHOUSE* have a carrying handle that can be used as a drying rack for towels or gloves by tipping it forward. The unit, with its polished copper reflector and fan-forced radiant heat, has a tipover safety switch, automatic thermostat, and can be tipped upward to 20 degrees to give direction to the heat flow.

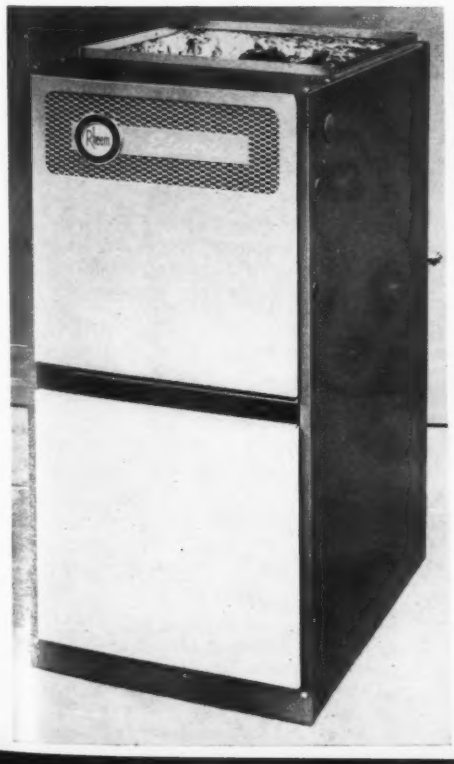


(ABOVE) — *WINTER AIR CONDITIONERS* by *MUELLER CLIMATROL* features large blowers and open-type construction to assure proper air delivery for winter heating and summer cooling. Both gas and oil fired models are available.

WARM MORNING GAS HEATERS by *LOCKE STOVE CO.* is offered in both light and dark colors, and will be available in hammertone beige, called "Desert Sand." They will also come in the darker "Sheraton Brown" finish. The units are radiant circulators of 35,000 and 65,000 Btu input capacity.



(BELOW) — *ELECTRIC HEATING* by *RHEEM*. The units come in capacities of 10, 15 and 20 kilowatts, equivalent respectively to 34,130, 51,195 and 68,260 Btu per hour. Optional two-speed blower provides greater air-handling capacity.



DecoRANGE by *SUNRAY STOVE CO.* is a free standing gas range with custom built-in appearance. The range is available in basic finishes which include dark and light wood-textured vinyls and metal and pastel confection colors, plus white. Tops are brushed chrome, and units may be purchased with or without dimensional backguard.

The primer that's fit to be tied

Paint a wire, dry it, tie it in a knot.

Not a crack, chip or flake if you do the job with Glidden NU-PON primer. Conclusive proof that tough, flexible NU-PON is the finest foundation for product finishing.

Glidden primers and product finishes are formulated to provide exactly the right protection against any set of conditions—corrosion, humidity, staining, impact, abrasion, heat, cold.

Your Glidden salesman can give you full information on the best Glidden finishing system for your particular product or products.

QUALITY Glidden PRODUCTS

FINISHES FOR EVERY PRODUCT

The Glidden Company
INDUSTRIAL PAINT DIVISION
900 Union Commerce Building • Cleveland 14, Ohio
In Canada: The Glidden Company, Ltd., Toronto, Ontario

No matter what your product, process or problem, Glidden Finishes plus Glidden Technical Service can provide the answer.

MPM

new industrial literature

Products Selector Brochure

A new pocket-size brochure tells how to select cleaners, cutting lubricants, drawing compounds, rust preventitives, forging compounds, and extrusion lubricants. The brochure lists 46 different compounds in these categories to simplify selection by pinpointing specific applications. Write Dept. MPM-B, 9210 S. Sangamon St., Chicago 20, Ill.

Welder Controls

A revised standard for resistance welder control equipment has recently been published by the National Electrical Manufacturers Association. Developed by the NEMA Industrial Control Section, the new standard includes definitions and cycle diagrams for all generally used resistance welding processes. Definitions and diagrams are cross-referenced with a master table listing NEMA identification numbers for the control equipment required to perform each of the described functions. All major control manufacturers list this equipment by NEMA numbers, as well as their own model or type numbers. For a copy of "Resistance Welding Control-IC-2-1960," send $1 to NEMA, 155 E. 44th St., New York 17, N. Y.

Bimetal Thermostats

A revised version of a full line catalog covering all main types of bimetal thermostats in the Stemco line has been announced. The four-page catalog pictures each of the major thermostat groups, and gives technical, specification and performance data for both semi-enclosed and hermetically sealed styles. Applications for the various types of Stemco thermostats include appliances, electronic and avionic devices, and apparatus. For a copy of Stemco Bulletin 8400 write Dept. MPM, Stevens Mfg. Co., Inc., P. O. Box 1007, Mansfield, Ohio.

Roll Forming Catalog

A full line of roll forming equipment is described in a recently issued bulletin. According to the bulletin, up to 75 percent can be saved by ordering custom rolls on a standard, mass-produced chassis. To obtain a copy, write Dept. MPM, The Lockformer Co., 4615 W. Roosevelt Road, Chicago 50, Ill.

Curtainwall Cements

A new four-page booklet describes hot or cold-bonding contact cements for curtainwall, office and sanitary partitions, desk and counter tops, and many other industrial uses. Application instructions and data on physical properties and strengths are given. Write Dept. MPM, Interchemical Corp., Finishes Div., P. O. Box 659, Newark 1, New Jersey.

Special Fasteners

A 40-page catalog gives complete data on Spring-Lock and other devices in a line of special fasteners. Spring-Lock plastic shelf supports are described as strong, attractive and low-cost. The "heart of steel" molded inside the plastic provides added strength. According to the catalog, strength and flexibility of head design make Spring-Lock ideal for cover knobs, drawer pulls and similar uses, in addition to their application as refrigerator shelf supports. Write Dept. MPM, Simmons Fastener Corp., 1768 Broadway, Albany 1, N. Y.

Pilot Light Catalog

A line of pilot lights designed for up to 25,000 hours of operation is described in a recently published catalog. The catalog explains how Omni-Glow pilot lights are easily attached to panels of any thickness by a vibration-proof speed nut. The lights are available in a variety of styles to meet a wide range of design requirements.

Mirro-Brite Mylar

Mirro-Brite Mylar, pressure-sensitive material for decorative trim or panels, is described in a new brochure. The brochure lists the 26 embossed designs available in six metallic colors, with or without pressure-sensitive adhesive backing. The material is available in continuous rolls, cut-to-size sheets, die-cuts, or in widths as narrow as one-half inch. Write Dept. MPM, Coating Products, Inc., 101 W. Forest Ave., Englewood, N. J.

Small Parts Conveyors

An eight-page bulletin describing small parts conveyors has recently been issued. Construction features of cleated belt conveyors for general, light and heavy duty are explained and illustrated, with photographs showing both the product and its application in each instance. For a copy, write Dept. MPM, The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Thermo-Setting Enamel

Duracron acrylic enamel is described in a recently issued booklet. Described are applications for home laundry appliances as well as many other products. According to the bulletin, the baked-on acrylic finish adheres excellently to metals and primers, is unusually hard and tough, and resists marring and corrosive effects of chemicals and detergents. Write Dept. MPM, Pittsburgh Plate Glass Co., Industrial Finishes Div., 1 Gateway Center, Pittsburgh, Pa.

Bethnamel Folder

A recently published six-page folder discusses both the two-coat process and direct-on cover coat enameling, and includes a number of tables and charts concerning Bethnamel, a new type of sheet steel. Write for Folder 734, Dept. MPM, Bethlehem Steel Co., Room 1041, Bethlehem, Pa.

Heating Elements

An eight-page brochure gives specifications and applications for a full line of band and strip heaters for water heaters, baseboard heaters, pressing bucks and a wide variety of uses. Write Dept. MPM, H. W. Tuttle & Co., Tecumseh, Mich.

Pulleys and Casters

A full line of pulleys and casters is described in a new bulletin. Covered are casters made in plain stem, swivel, ball bearing or plate design, with or without patented cam brake. Among the pulleys described is a V-belt model made entirely of stamped metal available with or without an oil reservoir. It is designed primarily for use as an idler pulley. Write Dept. MPM, The Nagel-Chase Mfg. Co., 2817 N. Ashland Ave., Chicago 13, Ill.

Spray Nozzles

Spray nozzles for washing, coating and rinsing are detailed in a new catalog. Described are a wide variety of types, capacities and spray characteristics, and adjustable joints, which allow quick setting of each spray to fit the work. Write Dept. MPM, Spraying Systems Co., 3203A Randolph St., Bellwood, Ill.

Hydraulic Platen Presses

A catalog describing a complete line of hydraulic platen presses has just been published. The catalog includes specifications and descriptions of presses from 25 to 500-ton capacity. Covered are presses for compression molding, bond-

ing, laminating, trimming and piercing operations and for laboratory work. Write Dept. MPM, Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill.

Electrostatic Hand Spray Gun

The availability of an illustrated bulletin describing a recently developed electrostatic hand spray gun with the new electro-centrifugal dispersion technique has been announced.

According to the bulletin, the device utilizes the basic principles of electrostatic spraying but pre-atomizes the paint particles by powerful turbine-driven centrifugal action. For a copy of Bulletin I-60 write Dept. MPM, Ionic Electrostatic Corp., 111 Monroe St., Garfield, N. J.

Pressure Sensitive Materials

A new "do-it-yourself" folder describing how manufacturers are using pressure-sensitive materials is now being offered. Applications of current products are illustrated and described. In addition, an envelope containing actual samples of various materials is included to demonstrate how the material is applied. Write Dept. MPM, Fasson Products, 250 Chester St., Painesville, Ohio.

Maintenance Painting Guide

A new guide to maintenance painting of industrial plants, machinery and equipment, and commercial and institutional buildings has recently been published.

The 24-page, full-color book discusses the different uses for various types of primers and finish coats, and shows samples of the colors available. In addition, it describes a number of special purpose paints, detailing their properties and recommended application methods.

One section of the guide spells out in detail the steps necessary for proper surface preparation. A two-stage chart pinpoints the recommended finishes for different types of surfaces, indicating the resistance of each finish to chemicals and other destructive agents.

Copies of Maintenance Painting Guide may be obtained by writing Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.

Special Motor Designs

A new 14-page electric motor "ideal book" and condensed catalog has been announced. Filled with useful data for designing, selecting and specifying, the book should be of particular interest to original equipment manufacturers who require special motor designs. To obtain a copy write on company letterhead to Dept. MPM, Doerr Electric Corp., Cedarburg, Wisc.

The Story of World Trade

The international economic revolution has forced a double challenge on the United States, one from the communists, the other from our allies in the free world. How the nation can build up its own industrial strength and that of its friends is a dilemma calling for rather nimble footwork until the world achieves a "state of grace" not now in sight.

This was propounded in a recently published booklet, "The Story of World Trade." How the situation developed, the current predicament and possible solutions are presented in the 32-page booklet. To obtain a copy write Dept. MPM, Public Relations, E. I. du Pont de Nemours & Co., Wilmington, Delaware.

Quick course in spray-cleaner selection

This new, six-page folder describes Wyandotte's full line of spray cleaners . . . covers one-operation cleaning and phosphating, simultaneous cleaning and rustproofing, heavy-duty cleaning without foaming, aluminum cleaning without etching, and many other important advantages possible with our specialized products. Send for your free copy, today.

Wyandotte®
Chemicals
J. B. FORD DIVISION
The best in chemical products for metal finishing

Wyandotte Chemicals Corporation
Dept. 3269, Wyandotte, Michigan

Yes! Please send your free folder, "Wyandotte products for spray cleaning."

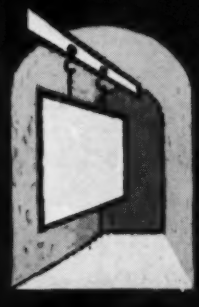
Name_____

Title or Dept._____

Firm_____

Address_____

City_____ Zone_____ State_____



SKIP
ONE
TRIP
THROUGH
THE
FURNACE...

NOW! PRACTICAL DIRECT-ON PORCELAIN ENAMELING WITH

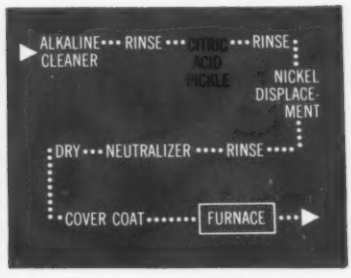
PFIZER

CITRIC ACID

(THE RAY-DAVIS **CITROBOND*** PROCESS)

CONVENTIONAL 2-COAT PROCESS

RAY-DAVIS CITROBOND PROCESS



■ Now you can produce excellent, one-coat porcelain enamel finishes on metal surfaces. Your present equipment, only slightly modified, can bring you the advantages of the new money-saving development....CITROBOND. ■ The principal innovation in the process occurs in the pickling bath—Pfizer Citric Acid is used in place of the sulfuric acid employed in conventional two-coat processing. ■ Citric acid so prepares the metal that a ground coat is unnecessary. You apply the cover coat directly. Each piece requires just one firing—in your present furnace, of course. The result is enameled steel, with excellent bond and a finish that will satisfy any customer. Excellent results can also be obtained using the CITROBOND Process with the new direct-on steels. ■ Pfizer will be glad to send you technical information on the modern Ray-Davis CITROBOND Process. The coupon below is for your convenience.

Science for the world's well-being

Pfizer

Manufacturing Chemists for Over 100 Years

*Process developed by W. G. Ray, Chas. Pfizer & Co., Inc., and Shipp C. Davis, Daco Corp.

IMPORTANT ADVANTAGES OF THE CITROBOND 1-COAT PROCESS

- no special handling of pickled steel required
- no major installation of special equipment required
- non-premium type steels can be used
- only one application—the finish coat
- citric acid is dry, non-toxic, water-soluble—easy to handle

MAIL THIS COUPON TO:
CHAS. PFIZER & CO., INC.,
CHEMICAL SALES DIVISION
630 FLUSHING AVENUE,
BROOKLYN 6, N. Y.

PLEASE SEND ME:
- ☐ TECHNICAL INFORMATION
- ☐ SAMPLE OF STEEL PORCELAINIZED BY RAY-DAVIS CITROBOND PROCESS

Name_____

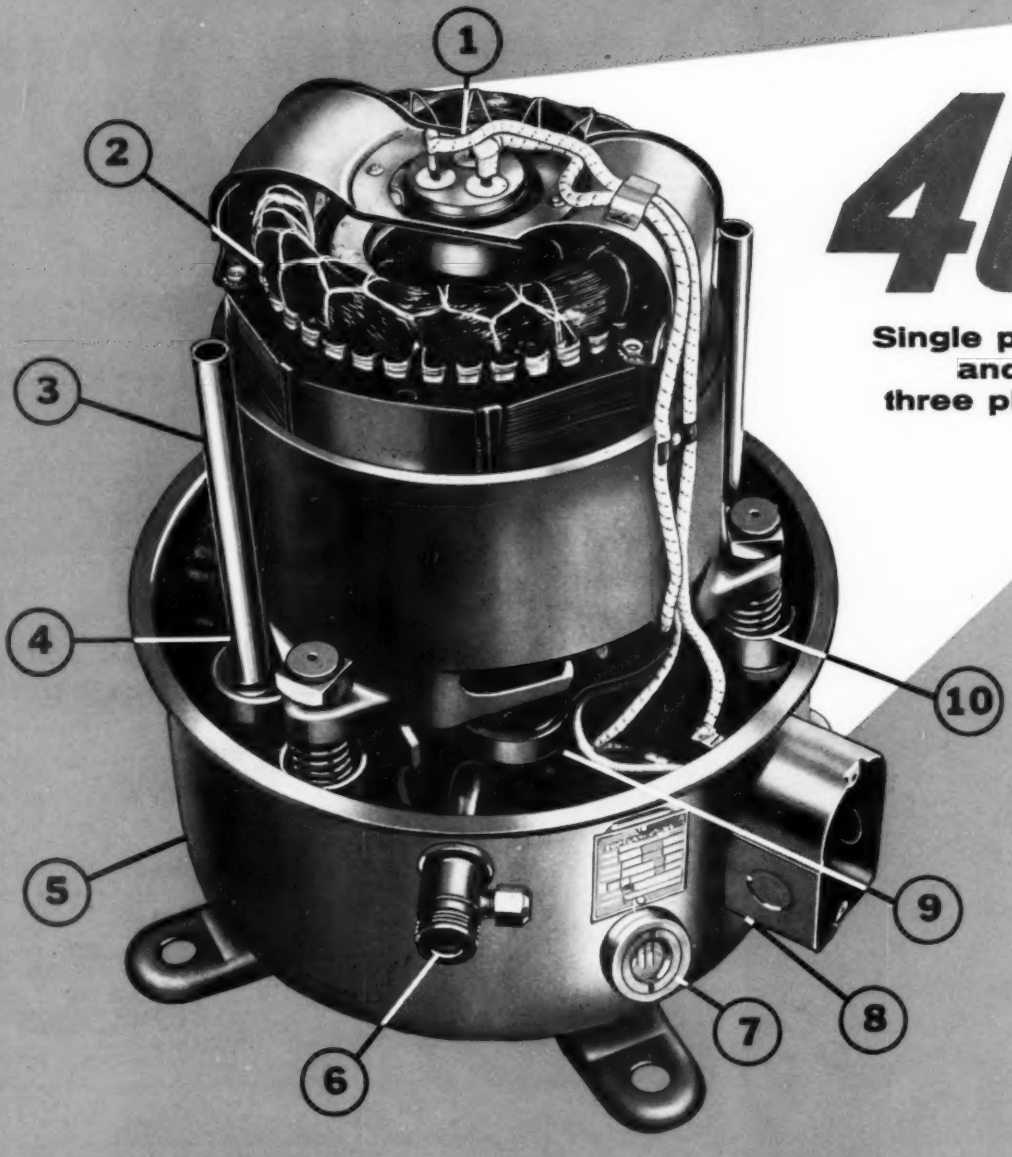
Company_____

Address_____

City_____ State_____

BRANCH OFFICES: Clifton, New Jersey; Chicago, Illinois; San Francisco, California; Vernon, California; Atlanta, Georgia; Dallas, Texas; Montreal, Canada

BETTER PERFORMANCE



4U

Single phase and three phase

4U Copelaweld WELDED HERMETIC MOTOR-COMPRESSORS

FEATURES:

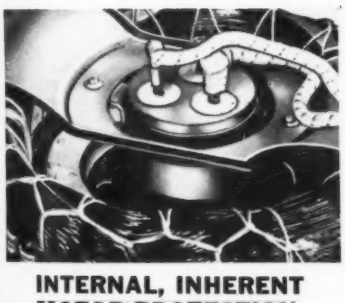
1. Internal, inherent motor protection
2. Heavy duty motor
3. Swedish steel valve reeds
4. One-piece body casting
5. Positive lubrication
6. Rotating service valves, spuds or stub tubes
7. Oil sight glass
8. Oil drain plug
9. Lightweight aluminum connecting rods
10. Internal spring mountings

STARTS HERE...

Copelaweld features

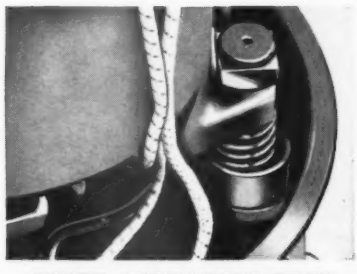
pack more value than ever into air conditioners and heat pumps

4 cylinders • 1750 R.P.M.
2½ H.P. • 3 H.P. • 3½ H.P.
4 H.P. • ...and now 5 H.P.



INTERNAL, INHERENT MOTOR PROTECTION

An industry first! Copelaweld inherent protection is internal, hermetically sealed . . . cannot be tampered with, by-passed or changed. No pilot circuit required . . . no current or temperature-sensitive devices outside the compressor shell. Close proximity of protector to motor provides superior locked-rotor and running protection and is independent of external ambient conditions.



QUIET, VIBRATION-FREE OPERATION

A new standard of smooth, quiet operation made possible by an unmatched combination of features: 1750 R.P.M.; four cylinders, 90°V, one discharging each 90° of rotation; and cast-in discharge muffler. Internal spring mountings isolate sound and vibration within the compressor shell. No need for costly suction and discharge vibration absorbers in most installations.

ENGINEERED FOR LONG DEPENDABLE LIFE

Lasting dependability, traditional with all Copeland products, is built into Copelaweld motor-compressors. Contributing to long life expectancy are: aluminum connecting rods for low reciprocating weight; valve plates of proven design; positive lubrication to all rotating bearing surfaces; and generously-sized, high-torque motors. Equipped with oil sight glass and drain plug.

Welded Hermetics,
Accessible Hermetics
or Belt-Driven...
COPELAND has
what it takes!

For complete specifications and performance data on the Copelaweld line of "4U" motor-compressors, request Bulletin No. 6026. Call or write direct.

SINCE 1918 **Copeland** REFRIGERATION CORPORATION, Sidney, Ohio

Manufacturers of performance-proved motor-compressors and condensing units for air conditioning and refrigeration

you need a **PROCTOR** *on your range*

CHAMPIONSHIP CONTROL

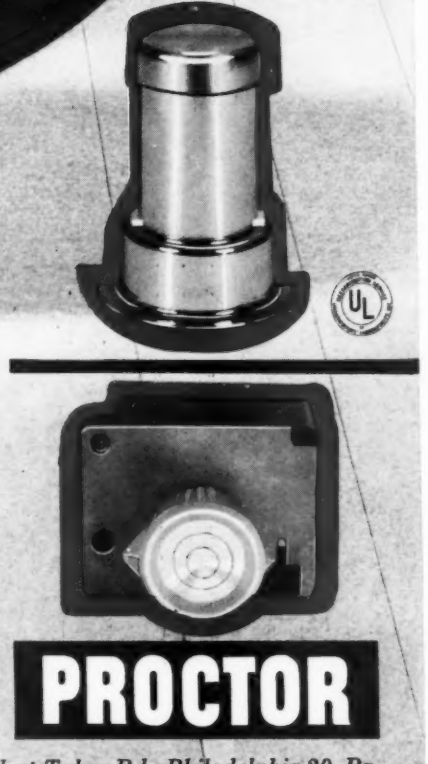
PROCTOR "SELECTRONIC" PAN CONTROL

scores strikingly in increased range sales. New cooking ease, because of accurate *at-the-pan* temperature control plus infinite selection of *any* temperature, has made "Selectronic" a real champion—and with room to spare.

PROCTOR "Selectronic" splits costs too. It is simpler and easier to install; has but two components, and fewer connections. Check these "right-down-the-alley" features that make PROCTOR "Selectronic" the king-pin of every modern electric range:

- **Consists of but two components . . . there is no troublesome transformer or fragile hydraulic tube.**
- **Easy to install . . . lowers your assembly cost.**
- **Provides infinite, stepless selection of the exact heat you want . . . never too hot or too cold.**
- **Responds instantly to temperature change . . . and to the rate of temperature change . . . a true proportioning control.**
- **Both components compensate fully for ambient temperature variations.**
- **Both components are smaller . . . the sensor is smooth stainless steel, free of crevices . . . stays clean.**

Bowl over all competition with a **PROCTOR** Range Control



PROCTOR

THE PROCTOR-SILEX CORPORATION, *Controls Division, 700 West Tabor Rd., Philadelphia 20, Pa.*

Fedders Sets Sales Record

The sale of Fedders air conditioners at the manufacturer, wholesale and retail levels set new records in the 1960 fiscal year. Salvatore Giordano, chairman and president of the Fedders Corp., reported that factory shipments for the fiscal year ending September 1 were almost 35 percent higher than the previous year.

Howard Expansion Begins

Ground has been broken in the first phase of a $1,500,000 expansion program of Howard Refrigerator Co., Inc. General factories and a general administration building will be built on a six-acre site in the Philadelphia Airport Industrial Section.

According to Howard President Albert Fogel, the new facilities will include the latest innovations in electrically controlled gun welding on an assembly line basis, along with automation of techniques in production.

Earnings Up, Sales Down

Sales of Admiral Corp. in the first six months of 1960 were $95,204,000, five percent higher than last year's sales of $90,894,700. Earnings, however, were down to $1,295,717, compared with $2,739,761 a year ago.

Sales to dealers of electronic products were 19 percent higher than last year, but the movement of appliances decreased 15 percent and was responsible for the squeeze on profits, the company said.

Electric Heat Market Growing

A survey by the Department of Commerce reveals that a record $27.8 million in shipments of permanently attached electric heating units was recorded in 1959. A total of 13 manufacturers who did not make electric heating equipment in 1959 plan production in 1960.

NWAHACA Convention Set

Final plans are being made for the 1960 convention of the National Warm Air Heating and Air Conditioning Association. Based on the theme, "America's Goal for '61 — Indoor Comfort for Everyone," the 47th annual meeting and convention will be held November 14-16 at the Statler-Hilton Hotel in Cleveland.

Friendly Frost Acquires Laundry Dryer Producer

Friendly Frost, Inc., as a further expansion into the vending machine field, has purchased the assets of the coin-operated laundry dryer manufacturing division of Vacuum Seal Corp., New Bedford, Mass. The firm also acquired the International Dryer Corp., Yonkers, N. Y., exclusive sales agents for the International dryer line, manufactured by Vacuum Seal.

International Dryer Corp., with national sales coverage and distribution, will serve as Friendly Frost's exclusive sales company for the International line of commercial laundry dryers, and take on the additional duty of selling the company's line of special purpose vending equipment.

"Anticipator" Added to Westinghouse Heat Pump

Westinghouse heat pumps are now equipped with an "anticipator" that provides advanced warning of outdoor temperature changes and assures closer temperature control within the home. The device has been included as standard equipment on all of the company's split-system heat pumps.

Use of the outdoor anticipator is said to reduce winter temperature fluctuation in a home and eliminate the wider temperature differential inherent with two-stage heating.

The new feature consists of an outdoor sensing element connected in a feedback system to the indoor thermostat. When the temperature changes appreciably outside, the thermostat re-

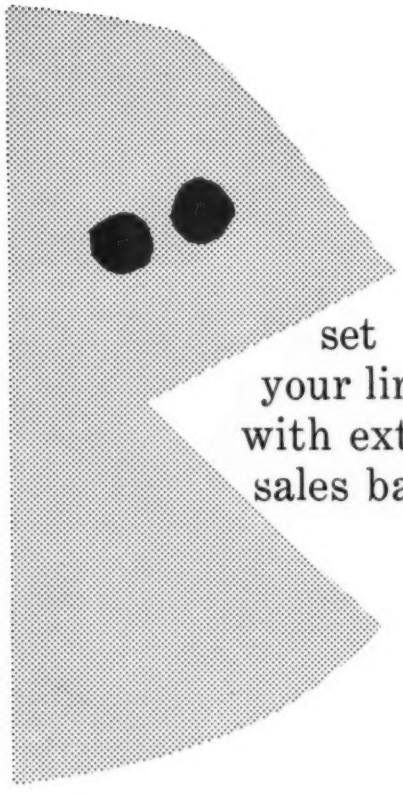
Whirlpool Coin-Op Dry Cleaner Enters Second Testing Phase

A Whirlpool Corp. coin-operated dry cleaner entered its second phase of testing recently when 50 units were placed for customer use in 20 cities.

Since its introduction in January of this year, climaxing two years research and development, prototypes of the dry cleaner have undergone extensive tests both in factory quality and engineering laboratories and in the field. Two of the units, located at Barlow's Coin-Operated Laundry in Benton Harbor, Mich., since early this year, have received heavy usage with "excellent results in both operational performance and customer acceptance," according to John Crouse, general manager of Whirlpool's commercial laundry and dry cleaning division.

Similar in appearance to the RCA Whirlpool combination washer-dryer, the coin-operated dry cleaner is a self-contained unit and operates on 220-volt current. Complete dry cleaning cycle takes an average of 50 minutes for a load of eight pounds. "Cost of each load will be approximately $1.50," Crouse said, "which can mean substantial savings of from $3 to $6 dollars over conventional dry cleaning costs for such quantity items as sweaters, skirts, men's suits, slacks and shirts."

New economy in dry cleaning is claimed for the new RCA Whirlpool coin-operated dry cleaner. Pioneered and developed at Whirlpool's Research Laboratories in St. Joseph, Mich., 50 of the units are in public use in 20 cities across the country. Each is maintained by a professional dry cleaner, and in most cases is installed in a coin-operated laundry. The dry cleaner will clean an eight-pound load in approximately 50 minutes at a cost of about $1.50. Two of the machines have been in use in a coin-operated laundry in Benton Harbor.



• specify • specify •

set
your line
with extra
sales bait

TI-CO® NON-FLAKING GALVANIZED SHEETS

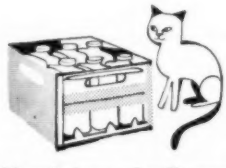
for COST SAVINGS

With today's squeeze between manufacturing cost and a selling price that moves products with satisfactory profit, every production saving deserves careful consideration. That's why many manufacturers are using Inland TI-CO galvanized sheets to more economically provide corrosion resistance for their product. ■ Many times TI-CO can be substituted for more expensive materials. TI-CO can eliminate the need for protective painting . . . often is less expensive. Or, if in your processing you normally form and then pot-dip production parts, this costly step can be eliminated by simply forming the part with the galvanized sheet that takes the toughest fabricating, yet won't chip, peel, crack or flake . . . TI-CO. You'll add extra "sales bait" at the purchaser's level too!

INLAND STEEL COMPANY 30 West Monroe Street · Chicago 3, Illinois Sales Offices: *Chicago · Davenport · Detroit*
Houston · Indianapolis · Kansas City · Milwaukee · New York · St. Louis · St. Paul

INLAND

Garage door maker saved costs of pot-dipping zinc coated steel rails and hardware when he switched to non-flaking TI-CO.



Manufacturer of milk cases obtained corrosion resistance and increased strength at reduced cost when he substituted non-flaking TI-CO for more costly metal.

TI-CO eliminated painting of hot rolled steel and provided added corrosion resistance for auto wheel suspension component.

ceives advanced warning and regulates the operation of the heat pump accordingly, thus anticipating the change indoors.

Harrison Receives ASTM Award

William N. Harrison, chief, enamels section, National Bureau of Standards, has received an award of merit from the American Society for Testing Materials. The award was made in recognition of Harrison's effort in the work of committee C-22 on porcelain enamel, and for leadership as chairman of the committee since its organization. The Porcelain Enamel Institute has maintained a research associateship at the Bureau since 1937.

Chromalloy Opens New Plant

Chromalloy Corp., formerly located in White Plains, N. Y., has moved into a 43,000-sq.-ft. plant in West Nyack, N.Y. The company's main activity is chromallizing — a method of diffusing chromium and other metals into the surface of mild steels, superalloys and refractory metals to improve resistance to corrosion, wear and heat.

The company says the Sintercast Div., currently in Yonkers, N. Y., will also move into the new plant later this year.

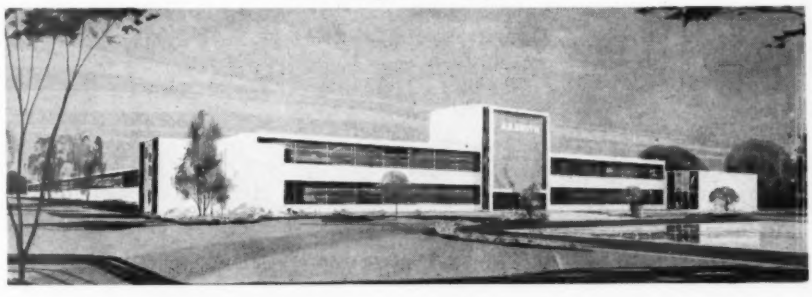
Madison Research Center Announced by A. O. Smith

The A. O. Smith Corp. will build an advanced research center near Madison, Wis., at an estimated cost of $2 million.

Ground is to be broken this fall on an 80-acre tract of land at the northwest edge of Middleton, just west of Madison. It is planned to begin advanced research activities in the new facility by the middle of 1961. Preliminary plans call for the construction of a 50,000-sq.-ft. building to house the company's advanced research group.

Robert McGinn, vice president of research and development for the company, said research in the new laboratories would be devoted to advanced fields in solid state physics and physical chemistry of materials, as well as the energy processes involved in the utilization of such materials.

Artist's concept of how A. O. Smith Corp.'s new advanced research center will look when completed next year.

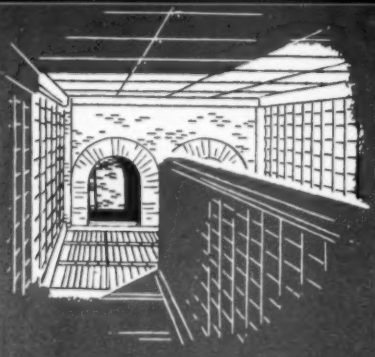


1960-61 Committee Chairmen Named by NAAMM Head

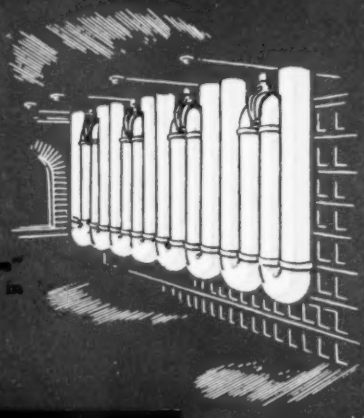
Jack M. Roehm, president of the National Association of Architectural Metal Manufacturers, has announced the following committee chairmen for the year 1960-61:

Architectural metal institute, and fi-

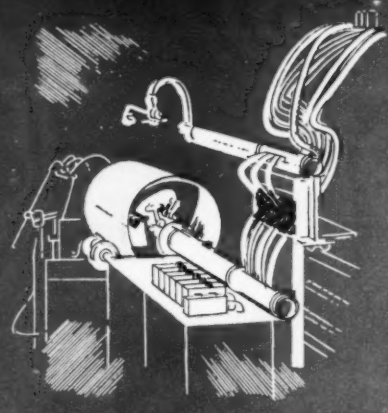
to Page 83 →



FIRST "U-Type" Continuous Furnace built in 1927, for Enamel Products Co.
...by Ferro

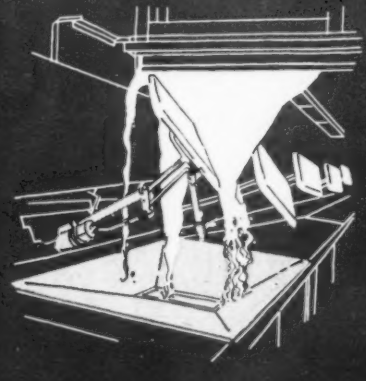


FIRST "Radiant-Tube" Continuous Furnace built in 1937, for Newark Stove Co.
...by Ferro

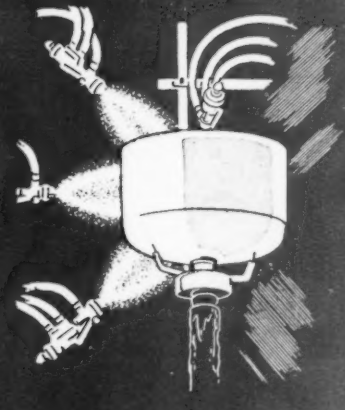


FIRST Fully-automatic Spray Equipment for water heaters built in 1955, for Rheem Mfg. Co.
...by Ferro

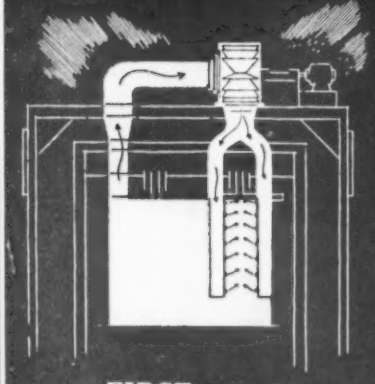
For ENGINEERING PROGRESS ...look to FERRO



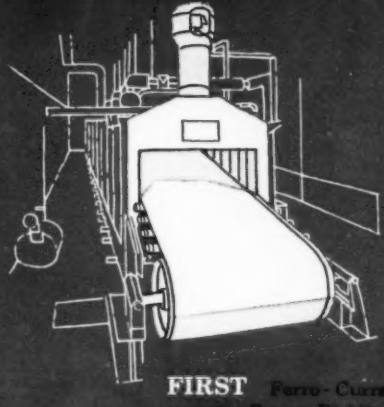
FIRST Fully-automatic Flow Coat Machine built in 1955, for General Electric Co.
...by Ferro



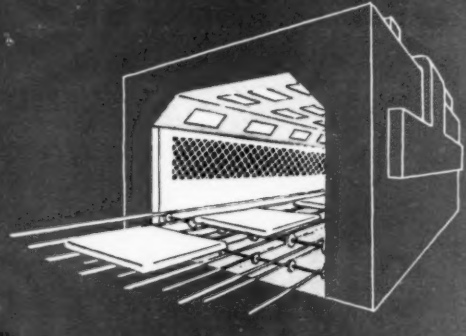
FIRST Fully-automatic Spray Equipment for washing machine tubs built in 1956, for Maytag Co.
...by Ferro



FIRST Porcelain Enameling Furnace with convected preheat air-current system built in 1956, for Porcelain Steel Corporation
...by Ferro



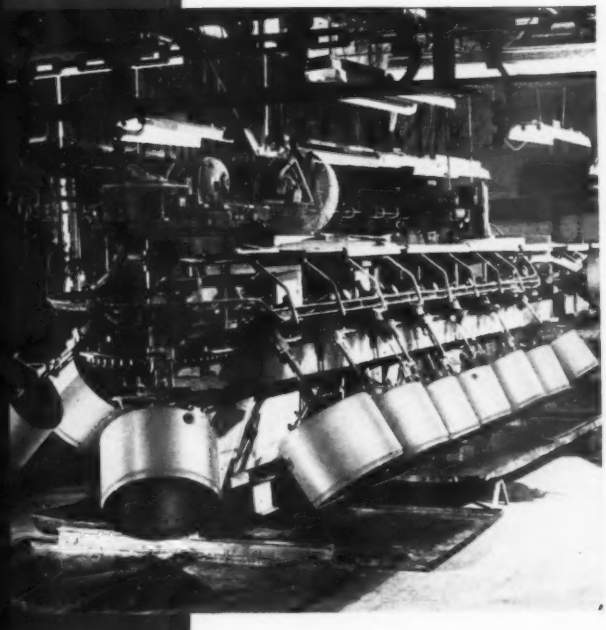
FIRST Ferro-Curran Automatic Spray Pickling Machine built in 1958, for American Radiator & Standard Sanitary Corporation
...by Ferro



FIRST Gas-Fired Infra-red Porcelain Enamel Drying Oven built in 1959, for Murray Manufacturing Co.
...by Ferro

"ENGINEERED-to-the-job"

AUTOMATIC DIPPING MACHINES REDUCE COSTS FOR WHIRLPOOL



FERRO automatic dipping machines are finding wide application in cutting porcelain enameling costs of items ranging from refrigerator crisper pans to bath tubs. A labor-saving device, it affords numerous advantages over hand dipping operations.

At the Clyde Division of Whirlpool Corporation, Clyde, Ohio, this automatic dipping machine has replaced a difficult manual operation. Now fully automated, it dips 600 washer tubs per hour with a minimum of handling and greatly improved (more uniform) quality.

SOME OF ITS FEATURES:

- Minimizes re-operations and wash-offs due to less handling
- Will handle various size tubs
- Assures uniform coating hour after hour
- Reduces cost of hand labor
- Eliminates staffing problems

If better, more uniform and lower-cost dipping operations are of interest to you, call in a FERRO engineer for the economic facts about an automatic dipping machine.

FERRO

FERRO CORPORATION

Engineering Division

4150 EAST 56th STREET • CLEVELAND 5, OHIO

INTERNALS made with famous G.S. precision give you better production

It's costly—in terms of machine time, man hours, overhead and customer dissatisfaction—to compromise on quality in Small Gearing for critical applications. You have no such worries when you order your Small Gears from G.S.—specialized equipment, specialized techniques and specialized, long-time experience assure properly designed, accurately cut Gears, produced to an unmatched standard of uniform accuracy. That means *your* production isn't slowed by rejects or imperfections—*your* product will operate smoothly and efficiently in the hands of your customers.

G.S. Internals like those illustrated above, for example, are cut to exacting specifications for such applications as air operated hoists, floor machines, radio equipment, navigating instruments and many other uses. If you use Internals—or any other type of Small Gearing—get G.S. in your picture!

SEND FOR FREE
Small Gearing Guide. Contains useful charts. Send for your copy today!

FRACTIONAL HORSEPOWER GEARING

GEAR Specialties, Inc.

2635 WEST MEDILL AVENUE
CHICAGO 47, ILLINOIS

SPURS • SPIRALS • HELICALS • BEVELS • INTERNALS
WORM GEARING • RACKS • THREAD GRINDING

WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF FRACTIONAL HORSEPOWER GEARING

---

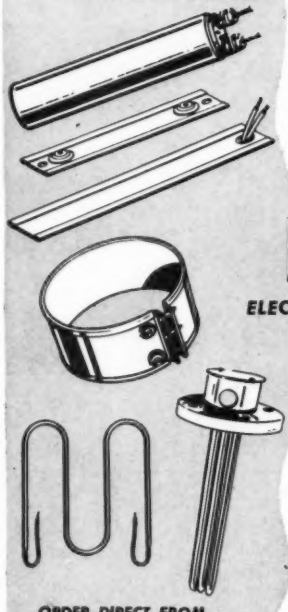
for **FASTER HEAT** *TRANSMISSION*

- LESS LAG
- LOW COST
- LIGHT WEIGHT

find out about

ACRA

ELECTRIC HEATING ELEMENTS



Most efficient, most economical, for applications in 100° to 1200° F range. Made to highest test standards, uniformly dependable, conform to known U. L. requirements. All types, all sizes, made to order. Engineering service, quotations, on request.

Send for informative HEAT DATA HANDBOOK "E"

SEND SKETCH, BLUE PRINT or SAMPLE PART

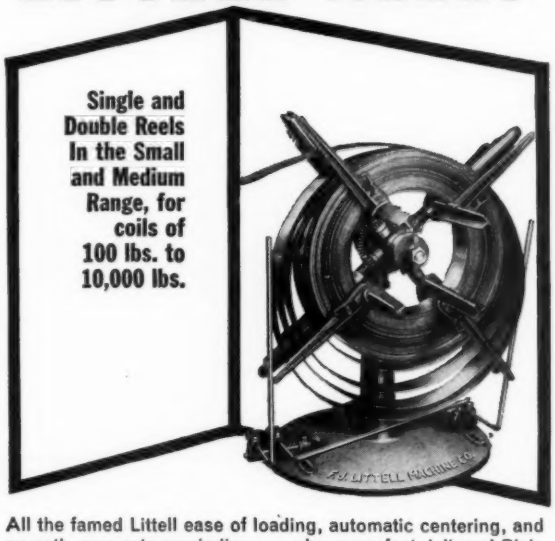
ORDER DIRECT FROM

ACRA ELECTRIC CORPORATION

9901-(MP) Pacific Ave. • Franklin Park, Ill.

LITTELL REELS

Single and Double Reels In the Small and Medium Range, for coils of 100 lbs. to 10,000 lbs.



All the famed Littell ease of loading, automatic centering, and smooth, accurate unwinding . . . plus new, fast delivery! Plain and motor driven. Write for full information.

F. J. LITTELL MACHINE CO.
Speed with safety

SERVING USERS OF COIL STOCK
Branches: Detroit Cleveland

Ask for Catalog "D"

4143 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Industry news

→ *from Page 79*

nance and budget — Emil M. Pollak, president, Illinois Bronze Works, Inc., Chicago; architectural metal specifications — Earl P. Baker, president, Baker Iron Co., Minneapolis; constitution and by-laws — Richard E. Stitt, secretary, Acorn Wire & Iron Works, Chicago; 1961 convention — Sol Perlman, president, A. Perlman Iron Works, Inc., New York, N. Y.; 1962 covention arrangements — Philip B. Neilson, president, Adler & Neilson Co., Woodside, N. Y.; 1963 convention site — Edward P. Benson, manager, Bronze & Aluminum Div., A. J. Bayer Co., Los Angeles; ethics — W. Harrison Graver, president, Engineering Metal Products Corp., Indianapolis, Ind.; finishes — Kenneth A. Matticks, manager, customer technical services, stainless-titanium-Hi Temp alloys, Crucible Steel Company of America, Pittsburgh; honors and awards and membership — J. T. Edwards, Jr., vice president, The J. T. Edwards Co., Inc., Columbus, Ohio; labor — Harry P. Blum, Blumcraft of Pittsburgh, Pittsburgh; legislation — William A. Boesche, president, The Ornamental Iron Work Co., Akron, Ohio; publications, promotion and advertising — William H. Withey, supervisor, construction markets, Armco Steel Corp., Middletown, Ohio; safety — J. Robert Haven, treasurer, Haven-Busch Co., Grandville, Mich.

Other committee chairmen were named by the NAAMM Curtain Wall Div. by Chairman Neil C. Dostal:

Market development — Clinton F. Hegg, vice president, Libbey-Owens-Ford Glass Co., Toledo, Ohio; constitution & by-lays — Richard D. Hickman, vice president, A. F. Jorss Iron Works, Inc., Arlington, Va.; membership — J. A. Mozur, general manager, Architectural Div., The Benson Mfg. Co., Kansas City, Mo.; research and development — Dan E. Morgenroth, manager, technical market development, Owens-Corning Fiberglas Corp., Toledo, Ohio.

Federation Meets in Chicago

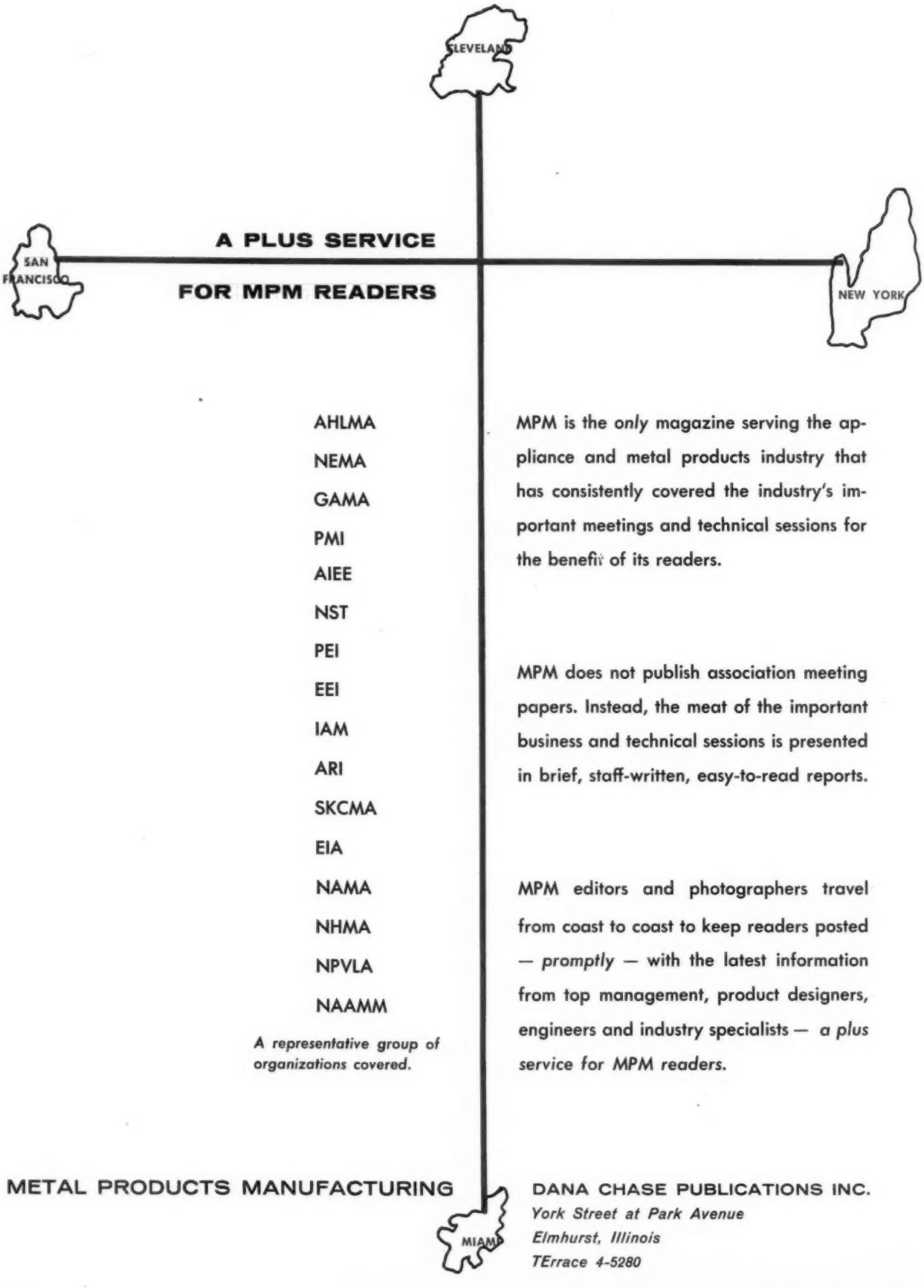
The 38th annual meeting of the Federation of Societies for Paint Technology will be held October 31 through November 2 at Chicago's Sherman Hotel.

One of the highlights of the meeting will be the Annual Joseph T. Mattiello Memorial Lecture presented by Henry F. Payne, professor in charge of organic coating research and technology at the University of Florida. The subject

to Page 86 →

Maytag Opens New Minneapolis Branch Office

The Maytag Co.'s new Minneapolis branch is now operating out of this new headquarters building in St. Louis Park, a Minneapolis suburb. The structure's new office, warehouse and service facilities were inspected by more than 300 persons from five states who attended a recent open house.



A PLUS SERVICE FOR MPM READERS

AHLMA
NEMA
GAMA
PMI
AIEE
NST
PEI
EEI
IAM
ARI
SKCMA
EIA
NAMA
NHMA
NPVLA
NAAMM

A representative group of organizations covered.

MPM is the *only* magazine serving the appliance and metal products industry that has consistently covered the industry's important meetings and technical sessions for the benefit of its readers.

MPM does not publish association meeting papers. Instead, the meat of the important business and technical sessions is presented in brief, staff-written, easy-to-read reports.

MPM editors and photographers travel from coast to coast to keep readers posted — *promptly* — with the latest information from top management, product designers, engineers and industry specialists — *a plus service for MPM readers.*

METAL PRODUCTS MANUFACTURING

DANA CHASE PUBLICATIONS INC.
York Street at Park Avenue
Elmhurst, Illinois
TErrace 4-5280

★★★★★★★★★

COMING FEATURES

GENERAL

HOW A STAMPING PLANT WENT OEM

RESEARCH AND DEVELOPMENT FACILITIES AT WESTINGHOUSE (COLUMBUS)

STANDARDIZATION IN APPLIANCE DESIGN

OPERATION OF A 12-PLANT QUALITY CONTROL SYSTEM

DESIGN

AIR CONDITIONER MEETS CORROSION PROBLEM

GAS BURNER DESIGN DATA

A NEW COMBINATION WASHER-DRYER

FABRICATION

FABRICATING ALUMINUM BASE ALLOYS (LAST INSTALLMENT OF 3-PART FEATURE)

FABRICATION AT SPEED QUEEN

FINISHING

NEW 650-FOOT STEEL COATING LINE

WHAT ABOUT DIRECT-ON AND LOW-TEMPERATURE PORCELAIN ENAMELING?

A SURVEY OF THERMOSETTING ACRYLIC PAINTS

SAFE TRANSIT

HOW CONTAINER MANUFACTURERS TELL THE NST STORY

★★★★★★★★★

Industry news

→ *from Page 83*

of his lecture will be "The Philosophy of Coatings." The lecture will dicuss the basic chemistry and physics of conventional binders based on carbon compounds and also the newer types, and will indicate the relationship between fundamental structure of the compounds and their performance in coatings.

Keynote speaker at the meeting will be E. Edgar Fogle, president of Union Carbide Chemicals Co. Fogle has been president of the company since 1957, following almost 30 years with the company in various aspects of chemical marketing and administration.

Lennox Names Subsidiary

Lennox Heating Co. Ltd. is the name of a newly announced subsidiary of Lennox Industries, Inc. The English firm will commence operations in the near future. The firm will initially offer one gas-fired and one oil-fired furnace.

Lennox Heating Ltd. will be headed by Robert B. Trezevant, former plant manager at Lennox Industries' Columbus, Ohio, headquarters. Technical chief will be Gerald B. Schroeder, former application engineer at Lennox-Columbus. Sales will be confined to the English market at this time, the company announcement said.

TREZEVANT

SCHROEDER

AIEE Announces Program For Technical Conference

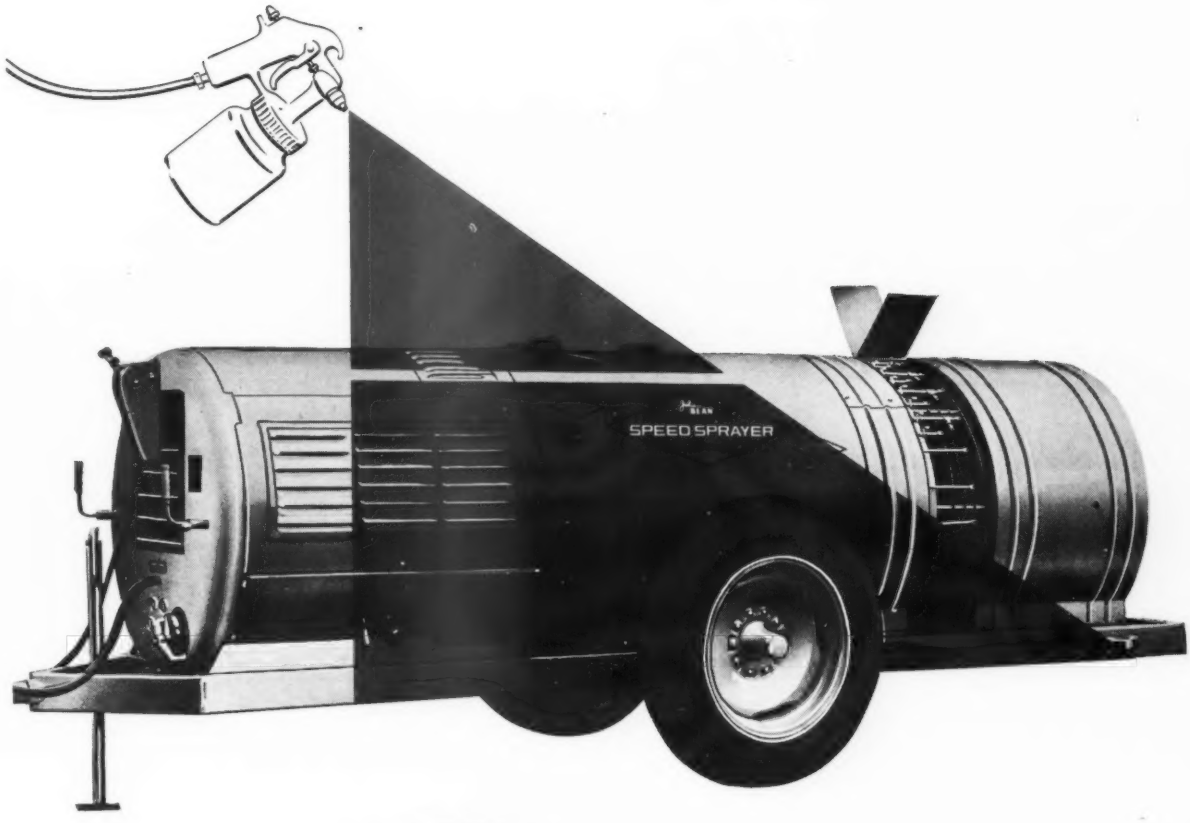
The lineup of topics and speakers for the Western Appliance Technical Conference has been announced by T. H. David, program chairman. Sponsored by the American Institute of Electrical Engineers, the meeting is scheduled for November 7 at the Biltmore Hotel in Los Angeles.

The Role of the Product Service Department in Product Design — H. R. Clark, manager, customer service, Waste King Corp.

The Relationship of Product Reliability to the Product's Market — speaker to be selected.

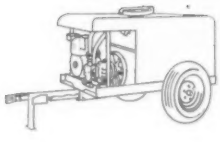
Corporate Aspects of Product Warran-

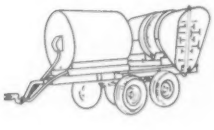
to Page 95 →

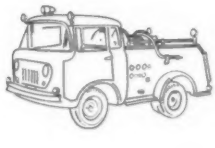


COOK'S provides beauty and protection

for John BEAN® automotive and agricultural equipment







The John Bean Division of Food Machinery and Chemical Corporation is a front runner in quality spraying equipment. Their wide-ranging line includes orchard, row-crop, shade tree and all-purpose sprayers for farm, home and municipal use.

Chemicals used in spraying solutions can be as damaging to painted finishes as insects are to crops. The John Bean people solve that problem by using Cook's chemical-resistant coatings to assure a durable (and good looking) exterior finish for their sprayers. They also use Cook's finishes on John Bean firefighting units, potato harvesters and other products.

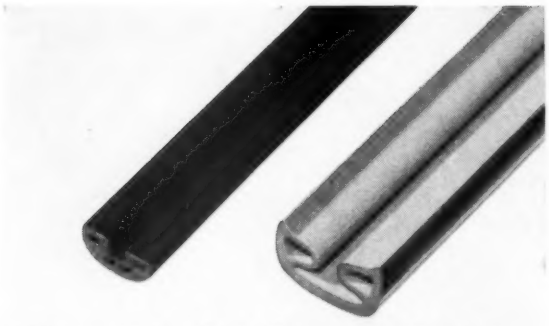
Hundreds of manufacturers of thousands of other products rely on Cook's Industrial Finishes to top off top quality with an enduring coat of protection and sales-promoting beauty.

What about your product? Call on us now to find out how Cook's may help step up its buy appeal, and return you substantial production savings as well.

COOK'S PAINTS

Cook Paint & Varnish Company
Kansas City, Missouri

Factories: Detroit • Kansas City • Houston



No matter what shape they're in...

CIPCO

(A DIVISION OF ESSEX WIRE CORPORATION)

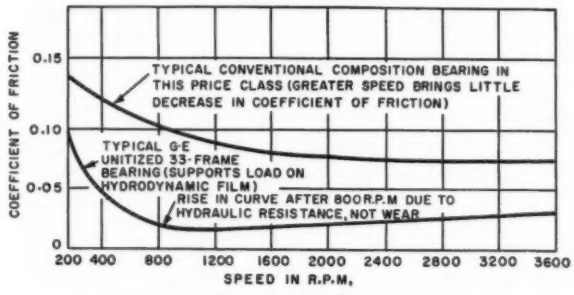
produces high quality extruded plastic components for appliances, in quantity . . . competitively priced.

- **Control of Chemical Compounding**
  CIPCO formulates their own compounds (the first plant in the industry to do so) thus increasing the finished products capacity to resist aging.
- **Volume Production**
  Banks of extruders and years of production know-how guarantee on-time delivery of a quality component.
- **Engineering Experience**
  Vast experience in the development of seal, vibration dampening gaskets and other plastic applications is available to help formulate an extrusion tailored to your application.

Write, wire or call for complete information and samples.

CAROLINA INDUSTRIAL PLASTICS
DIVISION ESSEX WIRE CORPORATION
Mt. Airy, North Carolina

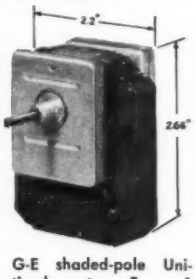
WEAR-FRICTION COMPARISON
GENERAL ELECTRIC VS. CONVENTIONAL MOTOR



Long life in *Unitized** motors results from new bearing design

Bearing wear in General Electric Unitized motors is greatly reduced as compared to conventional composition bearings. This is due to the hydrodynamic oil film developed by the G-E lubrication system. Thus these motors are ideal for refrigeration and other applications where long life without maintenance is essential. G-E Unitized motors operate at sound levels 25% below conventional motors, and their starting characteristics are excellent even at low temperatures.

* Trademark of General Electric Co.



G-E shaded-pole Unitized motor. From 1 mhp to 20 mhp, 2 pole.

FREE BULLETIN — Write to Section 727-02, Schenectady 5, N. Y.

GENERAL ELECTRIC

Let NAGEL-CHASE Supply Your V-Belt Pulleys!

- **Single Groove, FHP**
- **Strong, Welded, Pressed Steel Design**
- **Light Weight**
- **Wide Range of Standard Sizes**
- **2.4" to 12" PD for "A" and "B" Section V-Belts**
- **½" to 1" Bore**

Original equipment manufacturers whose products incorporate V-Belt Pulleys can make substantial production savings by obtaining them from Nagel-Chase. Specialists in the production of fractional HP pulleys, Nagel-Chase has the tools and production facilities for a wide variety of standard sizes. With this elimination of tool costs and the release of production facilities for other components, manufacturers find the use of Nagel-Chase pulleys cuts production costs.

Write for complete details and specifications

The NAGEL-CHASE MFG. CO.
2817 No. Ashland Ave., Chicago, Ill.

MPM

personals

Joseph R. Schmitt has been appointed executive director of the **Plumbing-Heating-Cooling Information Bureau.** Schmitt, who is the former director of advertising and sales promotion of the Universal-Rundle Corp., has had extensive experience in marketing, product development, and sales forecasting.

Richard L. Shinsky has been promoted to the newly created position of manager of product development of Aluminum Extrusions, Inc. He will plan and direct a program to develop new uses for extruded aluminum. He will also direct the activities of the company's consulting engineer and supervise the firm's model shop.

SCHMITT

SHINSKY

John G. Steeb, former sales administrator for **Whirpool Corp.'s International Div.,** has been promoted to sales manager. Steeb will succeed **Gerald F. Southland,** who will join Whirlpool International Bahamas, S. A. as sales manager for the newly established Eastern Hemisphere branch office.

Paul W. Neidhardt has been elected a vice president and director of **The Glidden Co.** Formerly general sales manager of the company's Paint Div., he will serve as vice president-operations, Paint Div., reporting to A. D. Duncan, vice president of the company and general manager of the Paint Div.

John W. Rayner has been appointed administrative assistant by John R. Rartizal, president, **Clearing Div.** of **U. S. Industries, Inc.** Rayner has been industrial relations director for two Chicago firms, Nachman Corp. and Benjamin Electric Co.

SOUTHLAND

STEEB

Arnold L. Buehl has been appointed director of engineering for the **Hotstream Heater Co.** Buehl will be responsible for the Cleveland firm's program of basic research and development and

NEIDHARDT

RAYNER

will direct the design and preparation of specifications for new products. He has been with Hotstream five years.

Carl T. Ashby has been appointed director of engineering for **Norge** refrigerators and home freezers. He resigned as president and director of engineering of Conrad, Inc., environmental test equipment manufacturer, to join Norge. Holder of a Ph. D. in physical chemistry and a number of United States patents, Ashby was president of Conrad since March 1956. Before that he was associated with Servel, Inc., for 22 years, directing research, development and engineering.

Copeland Refrigeration Corp. has announced two appointments. **T. W. Phelps** was named chief engineer in

BUEHL

ASHBY

charge of Copelametic design, and **Edwin L. Gannaway** was appointed chief engineer of Copelaweld compressor design. Phelps has been with Copeland since 1958. He was formerly employed by the Trane Co. Gannaway joined Copeland earlier this year, coming from Bendix-Westinghouse and Tecumseh Products, where he had held positions in advanced compressor engineering.

PHELPS

GANNAWAY

Fred B. Hartney has been named general sales manager for the **Gaffers & Sattler Product Div.** of **Utility Appliance Corp.** Hartney joins Utility after 10 years experience with the Frigidaire Div. of General Motors, where he most recently served as assistant to the national sales manager.

C. F. Rogier has been named director of research of the **Merkle-Korff Gear Co.** Formerly with Johnson Fare Box Co., Rogier will concentrate on product improvement and re-design and also begin development work to expand and diversify the company's family of products.

Sandford Curtiss has been appointed executive secretary of the **Steel Kitchen**

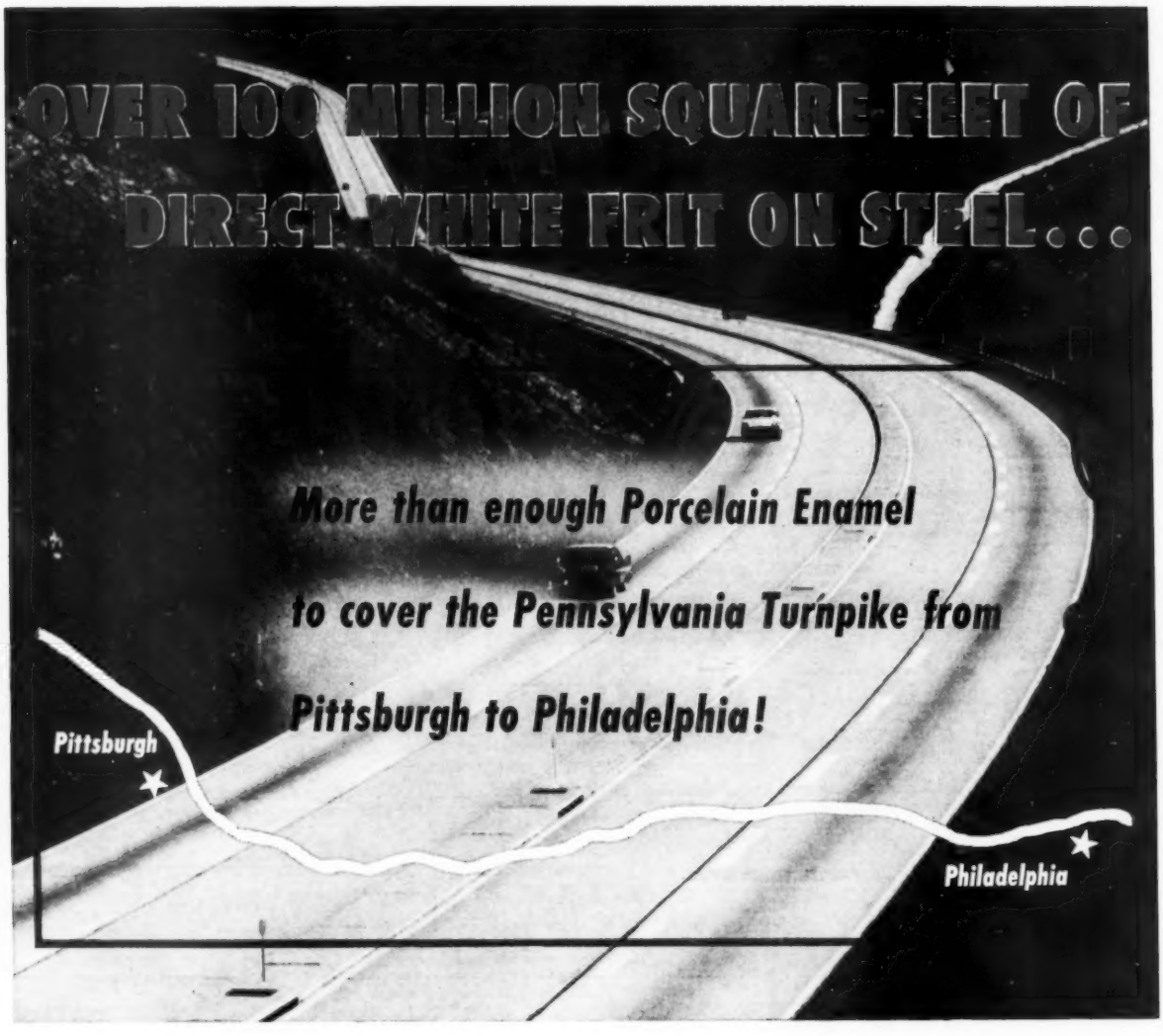
HARTNEY

ROGIER

Cabinet Manufacturers Association for the coming year. The announcement was made by Marvin J. Berz, president of SKCMA.

Joseph H. Schellman has been elected a vice president of **Controls Company of America.** In addition to his corporate responsibilities, Schellman will continue to have as his major assignment the position of general manager of the newly established Control Switch Div. with plants in Folcroft, Pa., Chicago, and El Segundo, Calif.

Jerry Lansky, director of public relations for **Fedders Corp.,** has been appointed district sales manager in the firm's Pacific region. He will be responsible for the sale of the Fedders line of air conditioning units and dehumidifiers.



Yes, sales figures show that The O. Hommel Company during the last 10 years has supplied more WHITE FRIT for DIRECT-ON steel applications than would be needed to porcelain enamel the Pennsylvania Turnpike from Pittsburgh to Philadelphia . . . Over 300 Miles!!!

From the original Hommelaya process patented over 30 years ago, to the most recent developments in WHITE ONE-COAT APPLICATION, HOMMEL HAS PIONEERED in the research and production of DIRECT WHITE FRITS. This leading position in the industry has been maintained through continuous research, using the newest steels and metal preparation techniques and . . . HOMMEL DIRECT WHITE FRITS ARE VERSATILE! . . . can be used over groundcoat for assured uniformity where both methods are employed . . . Available for low, medium and high firing temperatures.

Our wide experience in the development, manufacturing, and servicing of not only direct white frits, but regular groundcoats and cover coats as well, is available to you. . . . See your Hommel representative for more details—Or contact us direct.

MPM-1060

HOMMEL

THE O. HOMMEL CO.

PITTSBURGH 30, PA.

West Coast — 4747 E. 49th Street, Los Angeles, California

ADVANCE PROGRAM

22nd ANNUAL SHOP PRACTICE FORUM
UNIVERSITY OF ILLINOIS
Urbana, Illinois

J. B. Willis, Forum Committee Chairman

WEDNESDAY, NOVEMBER 16, 1960

BASE METALS AND FABRICATION

- Progress Report on Special Steels
  R. L. Myers, Armco Steel Corporation, J. K. Magor, U. S. Steel Corporation, D. J. Blickwede, Bethlehem Steel Company, Inc.
- Fundamentals of Drawability of Sheet Steel
  J. W. Frame, R. L. Whiteley, and D. J. Blickwede, Bethlehem Steel Company, Inc.
- Dry Drawing Compounds
  W. D. Wilson, Pennsalt Chemical Corporation
- Properties and Control of Drawing Compounds for Deep Drawing
  W. J. Wojtowicz and A. Fucinari, H. A. Montgomery Company
- Fundamentals of Resistance Welding
  J. F. Deffenbaugh, Federal Machine and Welder Company
- Effect of Surface Resistance on Seam Welding Cold Rolled Steel
  J. A. Schiefferle and D. B. Tolly, General Electric Company
- Effect of Pickling on Direct-on Cover Coat Adherence
  E. H. Mayer, H. N. Rahn, J. W. Frame, Bethlehem Steel Company, Inc.
- Gases in Enameling
  G. P. K. Chu, Pfaudler-Permutit, Inc.

THURSDAY, NOVEMBER 17, 1960

NOTABLE LECTURE SERIES—LECTURE No. 1

- Crystallization Phenomena
  A. I. Andrews, University of Illinois

TEST METHODS AND CONTROLS

- Wear-Abrasion Resistance Testing
  H. F. Russell, Ingersoll Products Div., Borg-Warner Corporation
- Revision of Commercial Standard CS 115-44 for Porcelain Enameled Hot Water Tanks
  C. G. Strobach, Rheem Manufacturing Company
- Strain Gages for Evaluating Stresses
  G. E. Selby, Armco Steel Corporation
- An Infra-Red Method to Monitor Materials Causing Porcelain Enamel Defects
  G. H. Bain and R. S. Sheldon, Whirlpool Corporation

MATERIALS, EQUIPMENT AND PROCESSING

- Fluid Pressure Regulators for Spray Control
  R. T. Arnold, Briggs Manufacturing Company
- Heat Exchangers for Chemical Metal Preparation
  J. B. Vernetti, Chicago Vitreous Corporation
- Gas and Electric Infra-Red Drying
  F. M. Dougherty, Ferro Corporation
- Porcelain Enameling Stainless Steel
  A. E. Farr, The O. Hommel Company
- Treating De-Enameled Articles
  J. J. Baker, Whirlpool Corporation
- New Production Method of Metal Preparation for Special Steels and Conventional Enameling
  J. M. Zander, Chicago Vitreous Corporation
- Reduction Nickel
  J. Finley, The Maytag Company
- Furnace Chain Speed Control
  M. B. Combs, Vitreous Steel Products Company

FRIDAY, NOVEMBER 18, 1960

ONE COAT ENAMELING

- One Coat Production Experience with Low Carbon Steels
  J. C. Swartz, Westinghouse Electric Corporation
- One Coat Production Experience with Low Carbon Steels
  L. E. Fussell and F. L. Michael, General Electric Company
- Use of Pickle Accelerators in One Coat Processes
  T. L. Stalter, Pemco Corporation
- Plant Experiences with Direct-On Application of Porcelain Enamels Utilizing Citric Acid
  J. J. McCallion, Chas. Pfizer & Company

LOW TEMPERATURE ENAMELING

- Furnace Modifications for Firing at 1400° F. and Lower
  J. A. Dvorak, Ferro Corporation
- Low Temperature Porcelain Enamels on Clothes Dryers—Field Test Experience
  R. S. Sheldon, Whirlpool Corporation

GENERAL INTEREST ITEMS

- New Applications and Markets for Porcelain Enamel
  W. E. Pierce, Porcelain Enamel Institute
- Flame-Sprayed Catalyst Coatings
  S. W. Bradstreet, Armour Research Foundation
- Research Associateship Report
  A. Potter, Porcelain Enamel Institute

METAL PRODUCTS STATISTICS

		1960 (Units)	1959 (Units)	% Change
Gas Furnaces	July	72,600	98,800	−26.5
	Jan.-July	467,800	532,800	−12.2
Gas Boilers	July	12,168	15,948	−23.7
	Jan.-July	70,334	70,140	+ 0.3
Gas Conversion Burners	July	8,800	18,900	−53.4
	Jan.-July	57,500	61,400	− 6.4
Oil-Fired Central Heating Equipment	June	36,089	44,312	−18.6
	Jan.-June	245,707	249,274	− 1.4
Gas Ranges, Free-Standing	July	89,200	116,900	−23.7
	Jan.-July	844,600	925,900	− 8.8
Gas Ranges, Built-In	July	24,200	26,800	− 9.7
	Jan.-July	200,900	187,300	+ 7.3
Gas Water Heaters	July	260,200	245,100	+ 6.2
	Jan.-July	1,615,700	1,787,500	− 9.6
Gas Vented Recessed Wall Heaters	July	27,900	38,700	−27.9
	Jan.-July	189,200	232,500	−18.6
Gas Floor Furnaces	July	4,800	7,600	−36.8
	Jan.-July	35,700	44,600	−20.0
Gas Direct Heating Equipment	July	148,600	146,000	+ 1.8
	Jan.-July	543,300	593,300	− 8.4
Gas Unit Heaters & Duct Furnaces	July	9,400	9,500	− 1.1
	Jan.-July	84,300	75,800	+11.2
Gas Incinerators	July	2,200	4,300	−48.8
	Jan.-July	25,400	23,800	+ 6.7
Electric Household Refrigerators	July	291,500	370,800	−21.4
	Jan.-July	2,069,200	2,237,100	− 7.5
Electric Farm & Home Freezers	July	97,500	124,600	−21.1
	Jan.-July	671,800	777,600	−13.6
Electric Ranges, Free Standing	July	57,100	67,100	−14.9
	Jan.-July	492,400	562,700	−12.4
Electric Ranges, Built-In	July	45,000	62,100	−27.6
	Jan.-July	393,600	415,400	− 2.8
Electric Water Heaters	July	55,800	70,300	−20.6
	Jan.-July	407,000	507,400	−19.8
Electric Dishwashers	July	34,100	34,500	− 1.1
	Jan.-July	311,700	274,900	+11.8
Electric Food Waste Disposers	July	52,600	63,500	−17.1
	Jan.-July	416,200	413,900	− 0.5
Combination Washer-Dryers	July	8,964	9,665	− 7.0
	Jan.-July	88,840	96,914	− 8.0
Washers—Automatic & Semi	July	174,608	251,300	−31.0
	Jan.-July	1,403,460	1,621,539	−13.0
Washers—Wringer & All Other	July	43,047	66,763	−36.0
	Jan.-July	416,901	506,709	−18.0
Electric Dryers	July	50,264	66,791	−25.0
	Jan.-July	362,592	406,601	−11.0
Gas Dryers	July	22,316	28,457	−22.0
	Jan.-July	192,585	196,068	− 2.0
Vacuum Cleaners	July	223,008	221,232	+ 0.8
	Jan.-July	1,905,476	1,932,422	− 1.4
Metal Furniture	Jan.-July	*	*	− 8.0
†Television	July	283,475	*	*
	Jan.-July	3,491,336	3,334,540	+ 4.5
†Radio (1)	July	890,359	*	*
	Jan.-July	9,414,879	7,936,621	−15.6
Typewriters	June	101,820	*	*
	Jan.-June	534,312	*	*(a)
Compressor Bodies (2)	Jan.-Dec.		4,926,657	+37.0
Steel Barrels & Drums	June	2,819,622	3,835,191	−26.5
	Jan.-June	15,256,681	18,410,715	−17.2
Room Air Conditioners	July	113,500	*	*
	Jan.-July	1,230,500	*	*
Unitary Air Conditioners (3)	Jan.-June	185,474	*	+15.0
Heat Pumps	Jan.-June	19,845	*	+25.0

(1) Including auto receivers (2) Except for household refrigerators
(3) Including heat pumps (a) Increase over 1958
* Not reported † Output — all other figures are factory shipments or factory sales

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.

safe transit

editorial voice of the national safe transit program

Devoted to improving packaging shipping, and materials handling methods for the appliance and metal products manufacturing industries. This section contains information on plant experience and industry advances for improving packaging and shipping methods, and prevention of in-transit loss. It also contains information on the National Safe Transit Committee's preshipmet testing program and reports on NST activities.

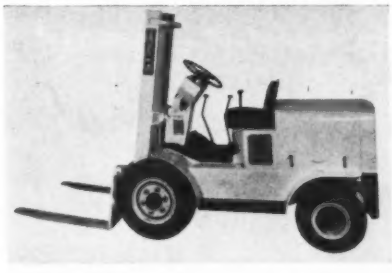
Bin Boxes Brochures Available

The National Wooden Box Assn. has announced the publication of a guide to lower handling costs in industry and agriculture. The brochure, resulting from numerous requests for an authoritative manual covering the economics, design considerations, material requirements, types and features of unit load containers, is called "Bin Boxes."

Prospective users of these handling containers may obtain a copy of the brochure from any NWBA member, or from their container or pallet supplier. If the supplier does not have a copy, refer him to the National Wooden Box Assn., 402 Barr Bldg., Washington 6, D. C.

Fork Lift Truck

A new 3,000 lb. pneumatic tired fork lift truck, designated the Y-3024, and the complete revision of their Y-4024, 4,000 lb. capacity, and Y-5024, 5,000 lb. capacity fork lift truck, also pneumatic

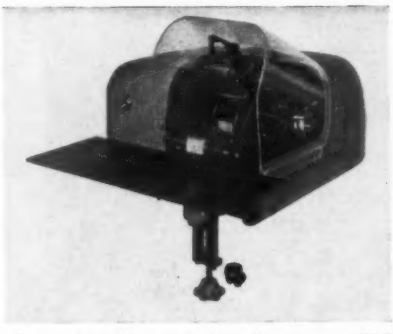


tired, has been announced by Truck-Man Lift Trucks, Jackson, Mich. The new truck features power steering, as do the other "Y" models. Other features include a 12-volt electrical system, a completely new exhaust system, and a fully instrumented panel.

For a brochure on these trucks, write to Truck-Man Lift Trucks, 573 Liberty St., Jackson, Mich.

Product and Package Marker

Parts and containers of virtually any size, shape and material can be marked at average speeds up to 3100 objects per hour on the new Markem 148A direct-offset machine. With no hand rolling or pressing, this machine automatically



places durable, neat imprints up to ¾" by ¾" on almost any surface — flat, curved, irregular, corrugated, etc. The machine can be bench mounted for in-line marking of items carried by a conveyor or dial feed, or it can be hand fed. The 1/20 hp motor is tripped by a foot switch or by conveyor line linkage.

Complete information on the Markem 148A machine is available from Markem Machine Co., Keene 55, N. H.

Union Steel Appoints Cleveland Representatives

Union Steel Products Co., Albion, Mich., recently appointed Basic Handling Systems, 32750 Solon Rd., Cleveland 39 (Solon), Ohio, as their representatives for the sale of USP Palletainers and other materials handling equipment throughout the greater Cleveland area. Basic Handling Systems was formerly the W. B. McClelland Co.

Conveyor Catalog

New products and techniques are included in the revised general catalog is-

sued by The Rapids-Standard Co., Inc., Grand Rapids, Mich., manufacturer of Rapistan conveyors, casters, wheels and other materials handling products.

New sections of the catalog cover APC (Adjustable Pressure) Conveyor wheel and live roller models, and Rapisteel slotted angle construction material. Photographs and diagrams are used liberally to illustrate new techniques and applications of materials handling equipment and systems in warehousing, manufacturing and other areas of business and industry. The catalog is indexed for easy reference. More than 150 photographs are included in the 44-page catalog, illustrating products, applications and facilities of the company.

For information concerning availability of the catalog, write to The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich. Refer to Catalog GC-1.

Shipping Container Mounting Systems

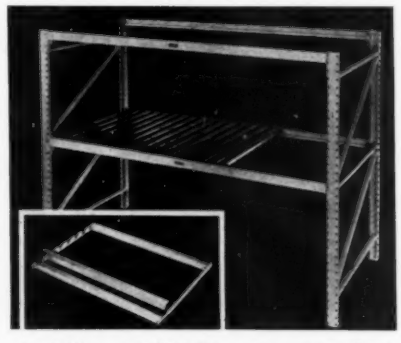
A 16-page bulletin describes how engineering protection against shipping/handling damage can be achieved with elastomeric mounting systems custom-designed by Lord Mfg. Co., Erie, Pa. Bulletin No. 716, entitled "Shipping Container Mounting Systems," presents basic considerations in design and selection of systems for in-transit shock and vibration control required for various methods of transportation. Specific examples of elastomeric mounting systems in the electronic, general industrial, and missile fields are illustrated.

Included is a design guide which enables packaging engineers to gain a rapid understanding of the factors involved in a suspension system, and get a quick approximation of drop height, deflection, fragility factor, and system natural frequency.

Speedeck Channels

Speedeck channels are said to quickly snap into spacer bars resting on pallet storage racks, to form decking for storage of materials that are not palletized.

The channels are available in lengths up to 4 feet, and provide a load range



of 40 lbs. to 1000 lbs. per square foot. These channels can be interspaced wherever desired on the rack between pallet loads. Each channel is 2 inches wide. The spacer bars hold the channels 2 inches apart, thus admitting light, aiding cleanliness, and meeting fire insurance requirements.

Complete information on the new Speedeck channels may be secured by writing to Storage Products Corp., 4418 Oakton St., Skokie, Ill.

Industry meetings

→ *from Page 40*

AIR CONDITIONING & REFRIGERATION

The Air Conditioning and Refrigeration Institute's 1960 Annual Meeting, Hollywood Beach Hotel, Hollywood Beach, Fla., November 18-22, 1960.

STOVE & FURNACE MANUFACTURERS

The Canadian Institute of Stove & Furnace Manufacturers' Annual Meeting and Workshop, Laurentien Hotel, Montreal, Canada, November 21-22, 1960.

INDUSTRIAL BUILDING

Industrial Building Exposition & Congress, New York Coliseum, New York City, December 12-15, 1960.

Industry news

→ *from Page 86*

ties — Herbert Leo, executive vice president and general manager, Utility Appliance Corp.

Direct Spark Ignition for Gas Appliances — Paul Neess, manager, market research, Controls Corp. of America.

Laundry Appliance Design for Compatibility of Either Gas or Electric Heating — Raymond Goodman, manager, washer-dryer engineering, Whirlpool Corp.

Shortcomings of Appliance Design from the Industrial Designer's Viewpoint — Henry Dreyfuss (luncheon speaker).

Present and Future Application of Semiconductor Devices in the Appliance Industry — R. P. Abraham, manager, device characterization and circuit development, Texas Instruments, Inc.

Shock Hazard Testing — Karl S. Geiges, vice president, Underwriters' Laboratories, Inc.

A Picture of National Utilization Voltages and Effects on Appliance Design — speaker to be selected.

Application of Shaded Pole and Permanent Fixed Capacitor Motors to Direct-Driven Blowers — John Smaxwell, engineer, component applications, General Electric Co.

What We Expect from an Appliance — panel discussion at evening session.

Cowles Buys Promat Div.

The purchase of the Promat Div. of Poor & Co. by Cowles Chemical Co. has been announced in a joint statement by Poor President Max Rupert and Cowles President R. F. Huntley. Promat manufactures and distributes metal finishing specialty chemicals including electroplating additives, brighteners, and metal coloring processes.

Among the products Cowles manufactures are metal cleaners, zinc phosphate coatings and other metal treating chemicals.

New Stamping Firm Formed

The formation of a new stamping company, Dupli-Tronics of Worcester, Mass., has been announced by President Ted Parker. The firm will specialize in the production of metal stampings in short or medium runs.

Metal Treating Symposium

The first Metal Treating Symposium will be held in the New Englander Motor Hotel, Westport, Conn., Thursday, November 3.

Sponsored by the American Gas Association in cooperation with The Bridgeport Gas Co., who will also act as host

company, and other Connecticut utilities, the symposium is intended to bring the metalworking and gas industries into closer harmony by meeting on common ground to discuss more efficient methods of heat processing.

The program has been designed to appeal to top metallurgists and company officers in charge of plant production. One of the features on the one-day meeting will be a luncheon-address by Herman Steinkraus, chairman of the board of Bridgeport Brass Co. He will discuss foreign competition.

McKay Buys Berkeley Co.

The McKay Machine Co., Youngstown, Ohio, has announced the purchase of the Berkeley Co., Danville, Ill. Berkeley produces arc welding equipment and McKay designs and builds sheet and coil processing equipment for automotive, steel and appliance plants.

Stolper Adopts New Name

A change in name to Stolper Industries, Inc., has been announced by the former Stolper Steel Products Corp. of Menomonee Falls, Wis. The new corporate title was chosen to indicate the 52-year-old company's increasing diversification of materials, services and product lines.

Willis Turns White

Our news editor's face is red. In the news announcement concerning papers scheduled for the PEI Shop Practice Forum to be held at Urbana, Ill., November 16-18 (see page 89, September MPM), the name of Pemco's J. B. Willis, who is Forum committee chairman, was inadvertently changed to J. B. White. Everyone in the enameling industry should know Jimmy Willis; nevertheless, our news editor prefers to be accurate in our news material and takes this opportunity to acknowledge an error.

A complete technical program for the PEI Forum appears on Page 91.

ASID Meets October 27-28

The contribution that industrial designers can make to corporate profitability will be highlighted at the American Society of Industrial Designers' 16th annual conference, October 27-28 at the Edgewater Beach Hotel, Chicago.

Some 400 industrial designers and business executives are expected to attend the meeting. They will hear case studies illustrating how major industrial and consumer goods companies use design in their marketing. The subject of product changes will be discussed by a panel.

More News on Page 101 →

Finished product conveyor system provides fast, automated handling

new Westinghouse supply depot linked to assembly area with modern conveying equipment

AN MPM STAFF FEATURE

AN AUTOMATIC CONVEYOR SYSTEM connects the Columbus Westinghouse appliance plant to a huge supply depot which is the final link in the firm's new nationwide distribution system.

Based on two huge supply depots and dozens of smaller satellite warehouses, the depot system went into operation last summer. According to Chris J. Witting, vice president in charge of the firm's consumer products group, the new system will eventually reduce major appliance inventories by 50 percent and at the same time provide prompt delivery to the company's dealers — and distributors.

The new distribution system carries a product mix including refrigerators, freezers, ranges, laundry equipment, dishwashers, disposals, water heaters, air conditioners and television receivers. In addition, a number of apparatus products will be stocked.

An important phase of the new distribution setup is a teletypewriter network which ties together 102 plants and 142 sales offices from coast to coast, facilitating rapid communications. In order to control inventories and process orders, the company has combined the communicating speed of its teletypewriter network with the processing speed of computers to get "the utmost in distribution efficiency." Ramac computers employed for field inventory control are located at Pittsburgh, and San Lorenzo, Calif.

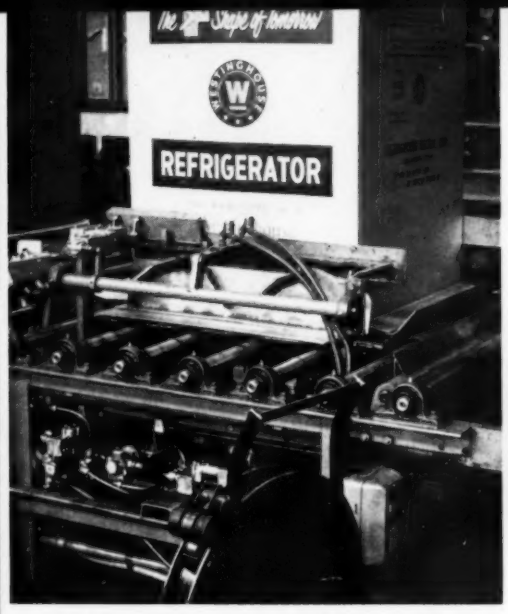
The Columbus supply depot, with a storage area of 700,000 sq. ft., is connected to the plant with an overhead, enclosed conveyor. Shipments are made from 22 truck docks and 32 railroad car loading platforms. The area is laid out so that additional manufacturing facilities can be built right under the present enclosed conveyor system.

In addition to transferring packaged products to the new supply depot, it is also possible to convey the product to

EXCLUSIVE MPM PHOTO

Overhead, enclosed conveyor links plant to new supply depot. Elevated construction allows for future plant expansion.

Refrigerator packaging. Corrugated carton bottom has been placed under wooden skid, and carton with top banded in place is slipped over refrigerator. One packaging line serves two refrigerator assembly lines.



Next step is automatic folding machine which locks carton to carton bottom.

Packaged unit proceeds to semi-automatic banding machine, where bottom of carton is banded.

EXCLUSIVE MPM PHOTOS

the old storage area at the end of the production and packaging lines. If necessary, packaged appliances can also be transferred from the old storage area to the new supply depot.

An additional advantage of the system is that it allows mixed shipments of appliances from the depot. As Cliff Heaton, manager of manufacturing services, puts it, "Our new depot will let us ship mixed cars, such as a combination of refrigerators, washers, dryers, dehumidifiers, water coolers and water heaters. Mixed cars now make up 65 to 75 percent of our shipments, and the new system gives us the facilities to do this efficiently."

Heaton explained another benefit: "It is now possible, and we are doing it at the rate of about 10 cars per day, to receive products from our Mansfield, Ohio plant by rail and truck. This allows us to ship mixed cars of all our major appliances, which include Mansfield products such as ranges, Laundromats, dryers, etc.

How it works

Two conveyors from the assembly lines feed the main conveyor leading to the new supply depot. One of the conveyors runs overhead and carries air conditioners, dehumidifiers, water heaters and water coolers. The floor-level conveyor carries refrigeration products.

One packaging line serves the two assembly lines for refrigerators. Refrigerators from the assembly lines are channeled onto the single packaging line by means of an electric eye coupled to a complex roller conveyor setup. The refrigerator proceeds down the line on a wooden skid, and the skid is rolled onto the carton bottom. A protective saddle is placed on each side of the refrigerator, and the carton, with its top previously banded in place, is slipped over the top. The unit then approaches an automatic folding device, which locks the base to the carton. The final packaging station is a banding machine which bands the base securely.

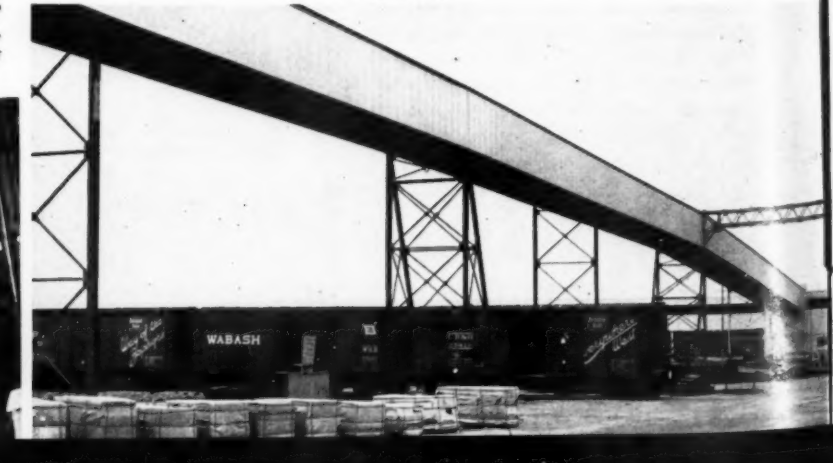
Packaged products on the two feeder conveyor lines are accumulated in 16-foot-long trains and travel at a speed of 40 feet per minute to an overhead intersection point. A dispatcher at the intersection point is able, by manipulation of a switch, to send the trains of products to the old warehouse in the main plant or to the distribution station in the new supply depot. From the intersection point to the old warehouse and the supply depot, the conveyors move at a speed of 80 feet per minute.

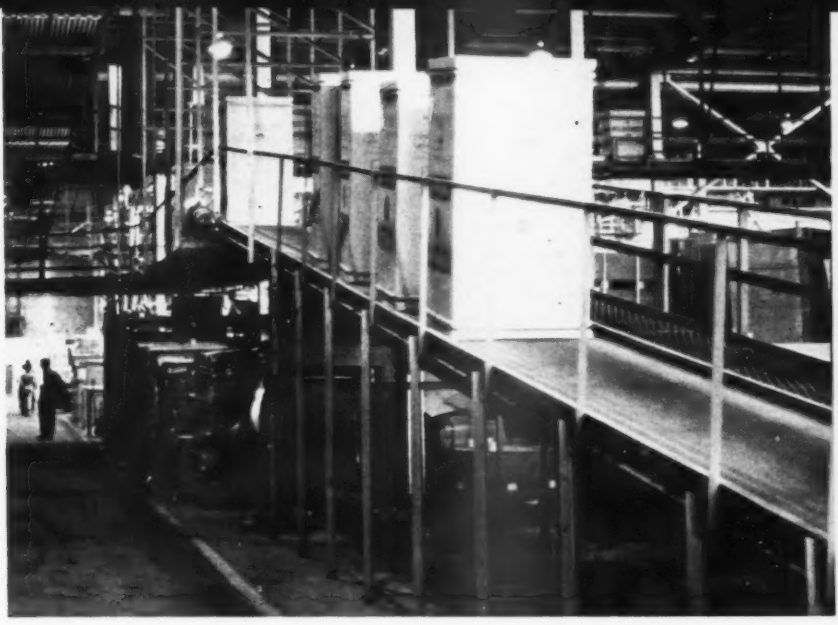
Across the bridge

The products that are directed to the supply depot travel on one of two conveyors which run in the enclosed "bridge." As the conveyors begin their descent to the supply depot, the two conveyors converge into a single service conveyor. When the products enter the depot they are "sorted" at a switching point controlled by an operator at an electronic board. The operator has a listing of the products being produced and delivered to the depot, and as each product passes the switching point he presses a memory-system button which causes the product to be diverted into one of the nine "finger" conveyors.

Second overhead conveyor from assembly carries water heaters, air conditioners, dehumidifiers, and water coolers. These products are also carried in 16-foot trains to the switching point, where dispatcher may send them to new supply depot or old warehouse.

Another view of overhead, enclosed conveyor which carries products to new supply depot.





Packaged refrigerators proceed up inclined conveyor on the way to elevated switching point, where products are sent to new supply depot or old warehouse and shipping area adjacent to assembly area.

From the switching point the products move at a right angle to the main conveyor. When the proper finger conveyor is reached, the product is automatically picked up by a hydraulically-operated table and gravity fed onto the finger conveyor.

A multiple chain conveyor is used to feed the finger conveyors because the wooden cleats, which are mounted on the bottom of most of the corrugated cartons, would make movement difficult on a roller-type conveyor. On the main conveyor the wooden cleats rest at right angles to the rollers, but when the products are transferred 90° to the multiple chain conveyor the cleats would be parallel to the rollers.

View of supply depot shows products arriving from overhead, outside conveyor (left foreground), operator at control board, finger conveyors, and stacked appliances (extreme background). Operator has list of products being produced, and, as each passes his control station, he pushes a button which directs unit to proper finger conveyor. Products are unloaded from finger conveyors and stacked or taken to shipping dock.

Refrigerators in 16-foot train pass over railroad car loading area in old storage area in route to switching point.

If a finger conveyor is full of products and another unit has been selected to go into this finger, the signal will automatically be cancelled and the product will be diverted to a by-pass conveyor and fed back into the system.

The first half of each finger conveyor is gravity operated, and the second half is a power-driven belt type which acts as a brake to keep the products from moving too fast. The packaged products are transported from the finger conveyors to storage areas or shipping docks with power trucks equipped with "trailers" which are long enough to carry four refrigerators. The trailer is backed up to the end of the finger conveyor, the trailer trips a switch which activates the belt conveyor, and the packaged units are moved onto the trailer. As the truck takes a load of products away, the time cycle established for the electrically-operated belt is such that the feeding section of the conveyor is again filled for delivery to the next truck.

Refrigerators, automatic washers and electric ranges are stacked four high in the storage area of the supply depot. Maximum height for stacking is 23 feet, which leaves approximately one foot of clearance to the roof trusses. All products except 13-foot refrigerators are handled four units at a time by high-lift stackers.

Fabricating

→ *from Page 44*

performed after a drawing sequence; the material being stressed entirely in compression during reduction of the diameter of shell top. The necking angle for aluminum shells should never be greater than 35 degrees, otherwise there may be a tendency for the top of the shell to collapse. In addition, the permissible maximum reduction in necking will be dependent upon the hardness of the drawn shell. For fully-annealed material, this reduction may vary from 12 to 15 per cent; with the shell at about ¼ hard temper, this reduction is at 9.0 to 12.0 per cent; and, with the shell at about ½ hard temper, this reduction is between 6.0 to 9.0 per cent. The increased thickness of the necked portion can be computed from the following formula: $T = t\sqrt{D/d}$; where T is thickness after necking, t is thickness before necking and D and d is the mean diameter of the shell before and after necking.

Curling

Although there are a number of methods that can be used for curling, the factors essential to all methods would include : (a) uniform height of edge to be curled: (b) any burr should be on the inside of the curl; and (c), the radius of curl should be at a minimum of two times the metal thickness. In the latter-stated factor, this minimum value is for the annealed temper and, where workability decreases in the tempered and heat-treated alloys, the radius will be increased proportionally.

Beading and roll flanging

Beading cylindrically-shaped aluminum parts is a simple operation which can be performed either by hand or by power driven rolls, depending upon the pressure required. Flanging the ends of tubes or cylinders can also be performed in a similar manner to beading.

Spinning

This process is limited to symmetrical shapes that are circular in cross section to the axis of rotation. Types 1100-0 and 3003-0 aluminum alloys are most frequently used and, although work hardening may result during spinning, it usually is not enough to require intermediate annealing prior to completion of the shape. The use of the stronger alloys, such as 5052-0, 6061-0, etc., may require annealing prior to completion

to Page 102 →

Industry news

→ *from Page 96*

Plumbing Fixture Shipments Up

Manufacturers' shipments of plumbing fixtures during the second quarter of 1960 amounted to $91.7 million, 18 percent above shipments during the first quarter of 1960.

Vitreous china plumbing fixtures, valued at $39.1 million, comprised 43 percent of the second quarter value of shipments; cast iron fixtures valued at $35.1 million accounted for 38 percent; and steel fixtures, valued at $16.7 million, accounted for 18 percent. The remaining shipments consisted of fixtures made of aluminum, monel, and other metals, and of earthenware, concrete and composition.

Glidden Texas Plant Begun

Ground breaking ceremonies for The Glidden Company's new $2 million paint plant were held recently at Carrollton, a Dallas, Texas suburb. The coating and resin plant will be located on a 34-acre tract and will serve Glidden's entire Southwestern region, which includes Texas, New Mexico, Louisiana and Mississippi. The plant is designed for an initial production capacity of up to 200,000 gallons of paint a month. It will produce the full line of Glidden consumer paints and lacquers and industrial products.

Steel Product Firm Formed

A new California corporation, Carmel Steel Products, has been formed to manufacture and nationally market steel-framed sliding glass doors, steel window wall and related architectural steel products. President Charles B. Le Bon says emphasis will be placed upon production of custom designs for architectural specifications of these products.

The new company, located in Downey, has purchased from Arcadia Metal Products, Fullerton, Calif., its entire line of steel sliding glass doors.

CRMA Sees Sales Jump

Despite a slow volume buildup during the first half of 1960, members of the Commercial Refrigerator Manufacturers Association generally feel that a second-half sales boost will be enough to give the industry a small increase over 1959.

Gathering at CRMA's annual meeting in Chicago, the executives were slightly less optimistic than last fall, when their combined forecast was for a 10 to 15 percent volume increase over 1959.

Galvanized Steel Shipments

Total shipments of galvanized steel sheets to the appliance industry during 1960 will approximate 130,000 tons, the Committee of Galvanized Sheet Producers estimates. This represents an increase of more than 50 percent over the total for 1954.

The estimate includes both direct mill shipments and shipments from warehouse and jobbers.

PPG Signs Licensing Pacts

Licensing agreements with six international manufacturers for the production and distribution of its Duracron thermosetting and Duracryl thermoplastic resins in the world market were announced recently by Pittsburgh Plate Glass Co. The arrangements were made by the company's international division, Pittsburgh Plate Glass International S. A.

The foreign licensees are: Badische & Anilin Soda Fabrik (BASF), Germany; Styrene Co-Polymers Ltd., and Lewis Berger Ltd., both of Great Britain; Lewis Berger and Sons Proprietary Ltd., Australia; Lewis Berger and Sons Ltd., of New Zealand; and United Paints Ltd., South Africa.

Cerro Sales and Earnings Up

Sales and earnings of Cerro de Pasco Corp. in the first half of the year substantially exceeded those of the like period of 1959.

President Robert P. Koenig said a part of the improvement was accounted for by the Rockbestos Wire & Cable Co. Div. and the Titan Metal Manufacturing Co. Div., both of which were acquired by Cerro at the end of March, 1959.

ADVERTISERS' INDEX

Fabricating the aluminum base alloys

→ *from Page 101*

of shape. When this anneal succeeds the final spin, a sizing operation may be necessary to eliminate the warpage resulting from the heat treatment.

The following suggestions are applicable in spinning of the aluminum alloys, namely: (a) it is recommended to retain a flange up to the final spin; (b) the lathe speed, with recommended values given in Table 2, will be in accordance to both blank diameter and thickness of the material spun; (c) in the event of wrinkling of the flange during spinning, it is necessary to remove the form-piece and hammer smooth the flange; and (d), in the event that the metal becomes too hard for proper flow, the workability may be increased by the use of a torch directed on the shell while it is rotated.

COMING
WELDING
PART III, CONCLUSION

Appliance motors

→ *from Page 63*

else, appliance manufacturers should concern themselves with reducing the condemnation of their appliances by the consumer. This condemnation is far-reaching, and untold damage can be done to the reputation of the brand name. (One user offered the fact that, because of her appliance motor failure experience, she knew of three friends who did not purchase that brand of automatic washer.)

It should be very clear that anything that can be done to lessen the service required on an appliance is to the appliance manufacturer's good. Manufacturers of motor controls feel that they can play a big part in helping the appliance manufacturers reduce this customer dissatisfaction. We do not try to make anyone believe that all types of motor failures can be prevented, but in regard to motor-winding failures caused by overheating and burnout, these can be prevented and will help reduce a large number of appliance motor failures. ■

Better products through better methods and steels

How zinc-coated steel cut 5 steps from automotive lamp housing fabrication.

When automotive head and tail lamp housings were drawn from cold rolled sheet steel and then zinc-plated or painted, as many as five or six handling and cleaning steps were required to make them corrosion-resistant.

Now, fabricated from Weirkote continuous-process zinc-coated steel, the housings go directly from the press to the assembly line. Further processing is unnecessary because Weirkote can be worked to the limits of the steel itself without chipping or flaking its corrosion-resistant zinc surface.

It's this superiority that caused the automobile industry to increase its consumption of zinc-coated steel more than 700% in five years; to use it in such varied applications as mufflers, window channels and the understructures of unitized bodies; to take advantage of developments such as differentially zinc-coated steel that can be welded at top production-line speeds.

A major supplier is Weirton Steel Company—producer of Weirkote continuous-process zinc-coated steel sheets and many other excellent steels that are improving products, methods and profits throughout industry.

Look for the STEELMARK on the products you buy; place it on the products you sell.

WEIRTON STEEL
Weirton, West Virginia

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana.

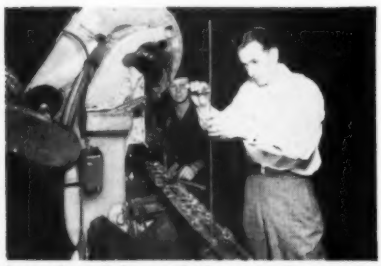
YOU CAN HAVE THE FINEST... *Specify TEP Products*

14-Point Assembly Line Inspection Pays Off In Every-Day Performance

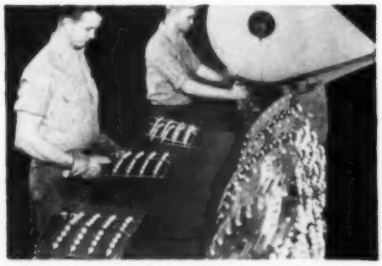
Fine quality and long service never *just happen.* They are the result of good materials, exceptional know-how and an exacting plan of quality control.

TEP Open-Coil Heating Elements get the benefit of 14 progressive inspection operations. Because of this careful quality control procedure, appliance manufacturers are always guaranteed dependable performance with "TEP-built" heating elements. 100% inspection of all units also saves time and trouble in assembly and testing.

Always specify quality and service . . . specify TEP.

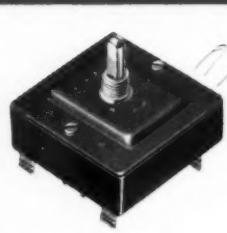


Inspection of frame slotting operation assures depth control for crossbar "breathing space."



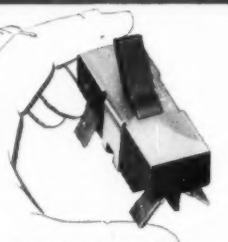
Outer frame gauging and visual cross-bar check insure squareness in accordance with specs.

For Appliance and Related Applications



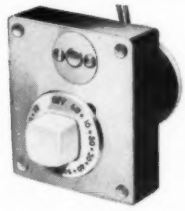
1 HEAT SELECTOR SWITCHES

Series 3000 rotary snap-type switches, also manufactured by TEP for electric ranges, air conditioners, space heaters and related applications, feature positive, trouble-free contact action and 7-heat selection. They are available either with or without a pilot light and with different shafts and handles to suit your needs. Write today for sample and quotation.



2 TOGGLE SWITCHES

The unusual simplicity of the new TEP Toggle Switch design achieved by Tuttle Research Engineers, now provides a dependable, top-quality switch at lower cost. Considerably smaller than comparative switches offering the same variety of contacts, it includes provisions for four-way wiring connections. There are only 11 working parts, and the complete switch weighs less than one ounce.

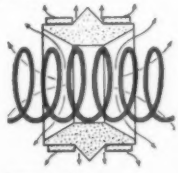


3 SINGLE POSITION INFINITE CONTROL

The N-14 Control enables a heating unit to deliver all or any portion of its heating capacity. Proportioning of heating capacity is accomplished by a pre-setting of the control knob, thereby controlling the time of contact dwell. Furnished in various time cycles depending upon your requirements, i.e., from 4 R.P.M. to ½ R.P.M. cycle motors.

4 TUBULAR HEATING ELEMENT

This element is ideal for a wide range of applications. It's highly efficient in heat guns, hair dryers, space heaters, hot food vendors, photo print dryers, and other products where air is to be heated while flowing through a tube or nozzle. It can be controlled thermostatically and furnished in ratings from 500 to 2000 watts at 115 or 220 volts.



Cross-sectional view of new TEP insulator and cross-bar design. More space for air circulation assures better heat dissipation, longer wire life.
Patent No. 2921172

5 OPEN COIL HEATING ELEMENTS →

The design and manufacture of "open coil" heating elements has long been a major TEP service to the appliance industry. TEP has designed and developed many new and exclusive features, such as the one illustrated with diamond shaped insulators. Call or write today for TEP design and engineering assistance on any job. There is no obligation.

Shape gauging inspection is another control that saves installation time and trouble.

Wire-threading and inspection are combined in 14-point TEP assembly-line procedure.

Final hi-potential and ohm check before packaging insures correct wattage and wire size.

TEP Products

WRITE TODAY for complete data and quotations

TUTTLE ELECTRIC PRODUCTS, Inc.

KIRKLAND, ILLINOIS • PHONE: 23321

MANUFACTURERS OF OPEN COIL HEATING ELEMENTS, SWITCHES, CONTROLS